FARMERS DIGEST

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Contents for February 1953

Plan Now to Pay Less Tax	Farm Journal	1
Look What He Did on $25 Land!	Successful Farming	5
Bugs Increase Feed Efficiency of Cattle*	West Virginia University	8
Blood Analysis Unlocks Beef Growth Secrets	Capper's Farmer	9
Make High Profits With Guineas	Poultry Tribune	11
Eight Breeding Tools	Guernsey Breeder's Journal	13
New Remedies for Bloody Scours in Pigs	The Hormel Farmer	19
Fuller Brush Man and the Cotton Harvest	Agricultural Engineering	21
New Insecticides Are Fed to Plants to Kill Bugs	Univ. of Wisconsin	23
Good Turkey Ranges Boost Profits	Turkey World	26
Why the Pork Market Has Slipped*	University of Nebraska	30
How to Handle Cornstalks	Rural New Yorker	31
How to Breed Productive Beef Cattle	The Hereford Journal	35
Cattle Graze Cross Wind*	Nebraska Extension	38
Aiding El Salvador	Nation's Agriculture	39
Rambling Alfalfa, New Hope for Dryland Pastures	Crops & Soils	41
Farm Hands Never Had It So Good*	Michigan State College	45
Lincoln: What He Did for Agriculture	Kansas Farmer	46
Borer Resistant Corn Performs Well*	University of Minnesota	48
Improve Dairy Herd With Type Classification	N. M. Extension News	49
Fifteen Years of Sow Testing	The Farmer	51
Barn Cleaner Cuts Hard Work*	Wisconsin Extension	54
Your Lease Sets the Pattern	Iowa Farm Science	57
Hens Have Hen Parties*	Farm & Ranch News	60
Farm Drainage Problems	Rural New Yorker	61
Minnesota-Mississippi 4-H Exchange	The Kraftsman	65
Mathematics of a Managed Pasture	Soil Conservation	67
Antibiotics Save Hog Feed Costs*	Iowa State College	68
Prussic Acid Poisoning in Sheep and Cattle	Sheep Breeder	69
Chemical May Replace Lawn Mower*	Capper's Farmer	73
Key to Soil Fertility	American Fruit Grower	74
Most Gains for Feeders of Livestock*	Michigan State College	76
Concord Country and One Wild Grape Seed	Pennsylvania Farmer	77
The Swine Breeding Herd	American Hampshire Herdsman	81
Lightning Protection on Farms	Florida Grower	85
New Way to Turn Eggs Hatches More Chicks	Missouri Ruralist	87
New Federal Swine Grades*	Washington Extension Service	88
Progress Report on Liquid Fertilizer	Better Farming Methods	89

* Short Features — a few of the many in this issue. Index, pages 95-96.

The Farmer's Digest

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February is a good month to think about the coming year... to consider how best to get the most from your land and labor in 1953.

It looks now like 1953 will be another good year, but not quite so good as 1952 for farmers in general. From now on—it appears—the real profits in farming will go to the men who do a good job of management.

For you and other progressive farmers, good management is largely a matter of good information... the kind of facts and figures you find in Farmer's Digest. That's why our editors make it their business to find, read and select the important articles on farming from over 60 U. S. and foreign farm magazines and from many other sources. We present them to you in concise, convenient, palatable form. In fact, we believe that, hour for hour, you can gain more real information about farming from Farmer's Digest than from any other source. That's why we respectfully suggest that you don't allow your Farmer's Digest subscription to lapse... why we ask you to mention Farmer's Digest to your friends and neighbors.

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The Farmers Digest
Volume 16 February 1953 Number 8

Plan Now for Next January and —

PAY LESS TAX

Manage your farm and figure your tax to pay the minimum—that's all Uncle Sam asks

Condensed From Farm Journal

True D. Morse
President, Doane Agricultural Service

YOU'RE probably paying more income tax than you ought to. A surprising number of farmers over-pay. It's your own hard luck, as far as the government is concerned—they take all the tax money you give them, except when they happen to discover a mistake in your figures.

What is the honest amount of tax to pay? It's the smallest legal amount—the government doesn't require, suggest or want you to pay more. But it's up to you to figure the minimum on your own income.

Here are some suggestions that will help you save money while paying the right amount of tax.

Save Through "Capital Gains"

Livestock: You can cut part of your tax about in half by reporting "capital gains" on the sale of breeding stock held for a year or longer. Capital gains is considered an increase in your capital wealth, as distinguished from straight income. The tax on capital gains covers only half of the profit on sales.

• Ralph Smith of Iowa now raises his pigs from gilts instead of keeping older sows. The gilts, after 12 months, sell as breeding stock, and the income is reported as capital gains, thus cutting the

Reprinted by permission from Farm Journal
Philadelphia, Pennsylvania

taxable income in half. By turning over your breeding stock faster — but not before you've had them a year—you have more income that qualifies as capital gains.

Iowa State college says that such a change would save from $100 to $200 yearly on many farms.

● Frank Jones of New York state used to veal his dairy heifers. Now he raises them for replacements, sells some as bred heifers, and reports them as capital gains. This part of his tax is about half what it would be if reported as straight income.

● Bob Roberts, an eastern Colorado rancher, now runs a larger breeding herd of beef cattle, and keeps fewer steers. It gives him more income as capital gains. He holds more heifers for possible replacements. Even though many of the heifers are sold as culls, they qualify as capital gains if held for a year or longer.

The capital gains provisions apply also to sheep but not to poultry.

Timber: Before you sell timber, check local rulings on how to sell to get the capital gains tax. There are times—such as when you harvest timber year after year from the same land—when you should consider it as a crop, and pay the full tax. You'll pay less tax in the long run, though, if you sell timber in years when your income is less than average.

Time all your sales and expenses so as to stabilize taxable income from year to year. If you let sales pile up in any year, you may wind up in a higher tax bracket, and pay one-third or more of this extra income in taxes.

Year-Around Planning

● You can often sell livestock and crops before the end of the year—or you can wait for the new tax year. *But you must be on a cash reporting basis* to make full use of this type of shift. And it isn't wise to sell at lower prices just to get this advantage.

● You can take PMA loans before January 1 on stored crops and credit them to your income for this year, even though you don't sell the crop until later. But once you start this, you have to do it each year.

● Homer Fowler, a cotton farmer in California, will cash in a big crop this year. So he's working ahead on expenses to offset part of the high income. He will have all tractors completely overhauled before the first of the year; he's buying his seed, fertilizer, and supplies for next year's crops; and he's repairing buildings and fences. *He is spending to save.*

Avoid High Risks

It might not pay to take big risks—Uncle Sam takes one-fifth or more of the profits. You stand most of any loss.

Some Great Plains wheat farmers, raising the same crop every year on droughty land, will eventually go broke when a succession of crop failures come. They will have paid big taxes when the profits rolled in, but the bureau of internal revenue won't repay any of the money when losses come.

You can carry your losses back one year and forward five years —but those have to be profitable years, or it doesn't help.

For example: If you end up with a loss for this year, you can deduct it from your 1951 profits, and claim a tax refund for last year. If you didn't have enough profits in 1951 to cover the loss, then you can deduct it from the first year before 1957 in which you have enough profit to cover it.

Not all kinds of losses are deductible, so it might be wise to get a ruling before you do this.

Deducting Repairs

It pays to know which expenses you can deduct. Each dollar you miss costs you 22 cents or more in tax. Here are tips that will cut your tax bill:

You can deduct repairs, but not new improvements. Roger Field of Alabama re-roofed his whole barn at once, and had to depreciate the improvement for several years afterward. His neighbor put a new roof on his barn by "repairing" one-third of it each year —then deducted the total cost as expense.

Fencing and other improvements can be treated the same way.

You can't deduct land improvements such as building a conservation pond. But you can gradually improve your farm by filling ditches, cutting brush, and, under some circumstances, spreading lime. You can deduct all costs except your own labor.

What Else Can You Deduct?

Business Expenses: Make a record each day of both receipts and expenses—put down the cash paid for such things as nails, repair parts, tools and medicines for livestock.

Don't overlook meals, hotel bills, automobile and other travel costs when you make business trips to fairs and county agent or farm organization meetings. Keep a record of the food you buy for business visitors.

Food: The food your family eats from the farm is tax free, if the expense of producing it is not deducted. It might be a good idea to produce more for home use. More butchering may pay if you have lockers or a freezer.

Donations: You can now give 20 per cent instead of 15 per cent of your adjusted gross income (your total income minus business expenses) to churches and charity, and deduct it, *if you have proof.*

Keep a record of all donations —clothes, school and church dues, gifts to farm organizations, contributions to 4-H, FFA and other groups.

What Can You Depreciate?

Depreciation is the deduction you can make each year for the loss in value of things such as buildings and equipment that wear out or get out of date. Here are a few tips about depreciation:

Tractors and machinery which run many hours per year, or under tough conditions, can be written off in 10 to 20 years; wells and tile usually in 20 to 25 years.

Purdue university says: "Every farmer should have a permanent and continuous record, covering five years, for which depreciation is claimed."

You are paying taxes that you don't owe if you don't take depreciation on things such as: Farm buildings, tenant houses, water systems, wells, cisterns, fences and tile drains.

Split Income to Lower Taxes

1. Family partnerships, in which you join with any or all children of legal age, will cut taxes on large operations. Shares in the partnership can be split any way you like, and you can use tax-free gifts to create the partnership.

2. File a joint return with your wife. It will save taxes in any year when your income is more than $3,600.

How to Be Sure You're Right

Be able to prove everything for at least four years back. Accurate records will settle most disputes. Without record books, cancelled bills and receipts, you may have to settle for what the government guesses that you owe.

Know your rights. If your records are challenged, don't sign anything until you have all the facts. If necessary, talk to an attorney or a certified public accountant.

Get good income tax advice when you need it. It is not wise to hire a clerk who merely knows how to fill in blanks. Dependable farm income tax advisors must know modern farming. It is not enough that they grew up on a farm 25 years ago.

Not all federal or state tax collectors are experts on farm income taxes. They want to help, but can't know all the answers. So double check their answers if there is any doubt.

You can get free bulletins about income taxes in most states from your state college of agriculture. There are also helpful books that you can buy: "Farmers Income Tax," Commerce Clearing House, 214 North Michigan, Chicago, Illinois ($3); and "Your Federal Income Tax," Government Printing Office, Washington 25, D. C. (25 cents).

Look What He Did on $25 Land!

Wendell Oden hacked and hauled on some Iowa hills until he can say: "Watch out! Someday we'll grow more corn per acre than they do on level land!"

Condensed From Successful Farming

Jerry Beery

LINDLEY, Weller and Pershing —these are the soil names on Wendell Oden's Soil Conservation Service farm plan.

These names do *not* mean level land with black soil 10 feet deep. Instead, they mean land that was originally brushy, rolling pasture; timber; infertile, open fields; and occasionally cut by steep sided ravines. For much of his farm Oden paid $25 an acre.

Today his cropland will match bushels with some of the best in the Cornbelt. There are cow-per-acre pastures where once there was brush choked knolls and raw gullies. Fertilization, renovation and hand clearing have drained time and dollars away from his more immediate desires, but have paid off.

Oden's story is one of outstanding management — management of his money, time and land to build a productive, debt free farm from third-rate land.

Looking back to the lean years following 1934 when he started on his own in Appanoose County, Iowa, Oden says, "In those days I got the idea that if a farmer had a lot of livestock he could make a little money. So I built up my livestock. Pretty soon I was renting more acres in order to feed them. Then I reached a point where my labor could not be stretched further, so I bought hay. I had been doing this for some time when I read that if you took what you would spend on hay and spend it instead on fertilizer, you would get a lot more hay for your money. So I tried it —and the next year we didn't

Reprinted by permission from Successful Farming
Des Moines, Iowa

buy hay. We didn't need to.

"Those first four years (1934-1938) were hard for us financially. We were on a rented farm, and accumulating enough livestock and equipment for security on a loan was our toughest problem. We did it by frugal living —saving every penny not needed for absolute necessities—and buying calves and other livestock."

In 1938 Oden received his first big financial boost. This came in the form of a $1,500 loan from the Farm Security Administration (now the Farmers Home Administration). The local supervisor made him an operating loan for additional horses and breeding stock.

Given this initial push by the FSA loan, he forged steadily ahead. Oden says of himself, "I haven't worked miracles. I have just tried to apply the things I have seen and read. I watched the best farmers in my community. If a man had a better crop of corn, a good catch of seeding, or seemed to be feeding his livestock more efficiently, I had to find out why."

On the rented farm Oden expanded his operations to the point where his own labor could be stretched no further. He simply couldn't farm more acres, raise more hogs, and milk more cows and do a first-class job. He says, "I could have hired extra help or I could have tried to produce more per acre on that thin land. If I wanted to increase yields we would have to own the land because no landlord would pay his half on that much fertilizer and lime, so Mrs. Oden and I bought our first 80 acres. We paid $25 an acre for it and borrowed the $200 for the down payment.

"Brother, this white-oak soil of southeastern Iowa was poor—you could have seen a table tennis ball anywhere in the pasture at 40 rods. *We didn't want to buy land that poor. It was a case of having to.*

"But I had it figured out this way — once, this land produced good crops. Now it was like an overdrawn bank account. If I put the things back in that had been taken out, it should produce again. I hauled manure seven miles in a wagon and spread it by hand 'on grass' and the grass grew—and our milk checks grew!

"I was feeding more animals on fewer acres of grass. But the disadvantage was, my hay and pasture production was getting ahead of corn and oats.

"I had beef cows, which took a lot of this forage, but milk cows and hogs are what get little fellows like me ahead—milk cows to pay the operating expenses and hogs for mortgage lifting and necessary machinery.

"I had to have more corn! Would this land grow corn now? Could I clip a coupon on my in-

vestment in legumes, manure and lime? But if I used some of the home 80 for corn I had to get some outside grass.

"In 1941 I bought another 40 acres adjoining me on the south for $25 an acre and put part of the home 80 in corn. That corn yielded about 40 bushels per acre. Some of my friends on better land had corn that yielded 60 bushels. I was growing more forage per acre on my land than they were on *good* land — why couldn't I grow corn once in five years which was at least equal to the yields they got? It was seven years before I found that I could get those top yields by a heavy application of starter fertilizer at planting time."

Oden was raising more hay and grain. His labor situation was easing as his two boys grew older. He was culling and replacing poor producers with high producers which increased his milk output by almost 50 per cent. His beef herd was increasing at a rate which more than kept up with his hay and pasture. He was buying hay again. It was at this time that he began his heavy use of commercial fertilizer on meadows. He tells how it happened.

"I started by applying the amounts recommended (about 100 to 125 pounds of 0-20-0 at that time). I noticed that where I overlapped, legumes were better, so I doubled the regular application the next year. I have gone as high as 500 pounds per acre and still figure I had a good return on my investment." More milk, more beef, more forage, and more corn with little need for outside labor!

Interlaced through Oden's whole operation has been a keen sense of money management. He seldom had free money; he kept it tied up in livestock and in land. He planned ahead. He says, "If I borrowed money or had a payment to make at a given time, I would breed sows so the pigs would be ready to sell about the time it was due."

Greater production with the same amount of labor did not stop with the 120 acres of land he then owned. He was still renting a large acreage. He reasoned: "I keep only half the crop on rented land, but if I own it and use a good rotation and fertilizer, I will double the yield. Therefore, I have four times as much by owning the land." He purchased 40 acres in 1944 and 80 acres in 1946; in 1949 he acquired 120 acres more and in 1952 he purchased another 80. For some of this he paid $25 an acre and less.

On much of this acreage Wendell had to start literally from scratch. Buckbrush, scrub oak and poverty grass spelled a big investment to get into production. His theory there has been not to do it all at once. Taking a field at a

time, he has cut and grubbed by hand, fertilized and reseeded. Occasionally he has hired a bulldozer. Each time he gained a few more acres of productive pasture and cropland.

Oden credits a gentleman from West Virginia with telling him how to boost his corn yields. "Suh, if you can grow alfalfa you can grow cawn. You go home and get yo'self a fertilizer attachment fo' your cawn planter and po'r the fertilizer to yo'r cawn and you will grow good cawn." That was 1948. Wendell tried it and the result is that now he expects 70 to 80 bushels of corn per acre and hopes to average 100 some day.

Once a tenant who owed more than he owned, Wendell has come far. How did he do it? Wendell does not consider himself "self-made." He is the first to say, "I've had a lot of help from everybody. The county agents have always done their best to answer my questions. And the boys with the SCS have spent a lot of time working right here on the farm, and that first loan sure helped out."

"Bugs" Increase Feed Efficiency of Cattle

Feed the "bugs" or rumen organisms along with the steer if you want to increase feed efficiency of beef cattle, recommends Benj. F. Creech, extension animal husbandman.

"Bugs" are rumen bacteria which convert roughage to energy and body protein. These bacteria work in a steer's first stomach or rumen and do the actual job of getting grass and hay in shape for final digestion.

"We've learned through experiments," it is pointed out, "that if the bacteria are well fed, the steer's nutritional status is much better. For example, coarse, mature hay produces fewer pounds of beef because bacteria cannot easily digest it. Likewise, finely ground roughages settle out and pass on through the rumen without being worked over by the bugs."

Cattlemen who feed a low quality roughage need to feed a protein supplement which will increase the number of "bugs" or rumen bacteria, Creech advises. — *West Virginia University*

Farming is hard work, it's also the most dangerous, reports the National safety council. There are more fatal accidents in agricultural than any other single industry. Who do you know was killed in a farm accident? Don't join his ranks, be safe in your farm work.

Blood Analysis Unlocks Growth Secrets

Rate at Which Beef Animals Will Gain Can Be Foretold

Condensed From Capper's Farmer

WHEN you buy a bull in the future you may be able to demand a blood analysis chart that will give you an idea how fast he and his calves will gain. Wild dream? Not at all. H. O. Kunkel, working on a joint project of the biochemistry and animal husbandry departments at Texas experiment station, is unlocking long hidden secrets about animal growth. He has found at least two blood characteristics that foretell with remarkable accuracy how animals will perform in the feed lot.

That's something neither show judges nor feeders have been able to do in the past. For years, men in charge of feeding tests at a corn belt station have tried to predict which of the cattle that go into their lots would make the fastest gains, and which would lag. "Nobody ever came close," one of them said. "We might have been fully as accurate if we had rated them by drawing numbers out of a hat."

Ten young bulls were being studied. Among them was a pair of half brothers from the same ranch. During 120 days at the station they had all they wanted to eat of a mixed ration that forced both to eat the same proportion of concentrates and roughage. Each had consumed the same amount of feed, but one had gained 221 pounds, the other 276. At no extra cost, the growthier fellow had produced 25 per cent more beef. He had outstripped all others in the group. His half brother was the lot's slowest gainer. When these cattle were received from Texas ranches some good beef judges tried their hand at guessing which would do best. All had the usual poor luck. But the blood test placed them accurately.

Calves with the most thyroxin (secretion of the thyroid gland) in their blood made slowest gains. Those with the least thyroxin

Reprinted from Capper's Farmer
Topeka, Kansas

gained fastest. Where there was little difference in thyroxin content of the blood there was little difference in gains. Likewise, the level of gluthathione, another blood constituent, pictured gains accurately. Again animals with the smallest amount made the fastest gains.

With one exception, the picture remained unchanged from the time the calves arrived at the station. A bull whose blood was low in thyroxin and gluthathione was making rapid gains until a horn was broken off at the skull. To improve his appearance, the other was sawed off, too. He suffered a setback and fell behind some slower gainers, but the blood picture didn't change. Possibly nutrients needed for growth were used for tissue repair.

Like all true scientists, Kunkel and his co-workers make no claim that this is the last word in getting a quick picture of an animal's ability to turn feed into flesh. They intend to continue their tests. The study will be widened to take in other things than those mentioned. They will measure metabolism rate, chart blood enzymes, investigate what happens when an animal is starved.

Other tests on animals at Pantech station suggest that it may not be possible to rate animals of two breeds by the same standard, since the general level of certain constituents of the blood may vary with breeds. To date a costly feeding test has been the only accurate way to determine an animal's ability to grow.

If the Texas tests show, as the work progresses, that the blood picture will accurately predict the ability of an animal to gain, it could be one of the finest tools ever put into the hands of stockmen. A test tube appraisal would make it possible to type all bulls and heifers born in a herd. The owner then could select his fastest gaining heifers for cow replacements and send others to the feed lot. He could pick bull calves that would do the best job as breeders and make steers of the remainder. Counterfeiters could be weeded out of beef herds without going through the slow and costly process of bringing them to breeding age and judging them by their progeny. With such a process at hand, the feeder might find it practical to test steers and put into his lots only those having the ability to make profitable gains.

It seems reasonable to believe that if such a test will work with cattle, it could be adapted to hogs, sheep and poultry, too.

Eggs are high in vitamins A, B-1, B-2 and D. They also contain such necessary minerals as iron, phosphorus and calcium. But fortunately for those who must lose weight, the average sized egg contains only about 79 calories.

Make High Profits With Guineas

Virginia Growers Net 50 Cents Per Bird on Commercial Guinea Flocks

Condensed From Poultry Tribune

T. K. Wolfe

GUINEA production seems to be gradually increasing. Guineas, *"the delicacy with the gamy flavor,"* are popular not only in their own right, but as a substitute for game birds, such as pheasant, grouse, partridge and quail. Broiled, fried or roasted, they are providing a new taste treat.

William Garber and his brothers of Rockingham county, Virginia, have been raising guineas for five years. They started with 400 African White breeders, but they have stepped up their number each year and now have 4,000. They prefer the African White, for it is a meat type bird with white flesh.

The Garbers raised around 12,000 keets (baby guineas) this year. The birds reach an average market weight of from two and a quarter to two and a half pounds each at about 12 weeks of age. That is quite an improvement over the record of only a few years ago. William Garber says that five years ago it took about 17 weeks to produce a two and a half pound bird. He attributes the improvement to better bred birds, better feed and better management know-how.

Fortunately, keets are easy to raise. Generally the same rules apply to their production as to that of baby chicks. The feed conversion is the same—approximately three pounds of feed per pound of gain. The brooding temperature the first week should be from 95 to 100 degrees—somewhat higher than that required for chicks. The drop should be decreased five degrees per week until 70 degrees is reached.

Garber finds it advisable to keep the keets near the brooder stove the first few days. Usually a circular guard, preferably cardboard, is used for that purpose. He warns that the guard should be from four to five feet from the edge of the hover so that the birds can get away from the heat, if they desire. He keeps the litter

Reprinted by permission from the Poultry Tribune
Mount Morris, Illinois

within the guard covered with rough (not slick) paper or cotton bags. Keets move faster than chicks, and if slick paper is used, they are likely to slip.

Garber has found it pays to allow the same amount of floor space and use the same kind and number of waterers and feeders for guineas as for chicks. Keets will waste more feed than chicks if the feeders are filled more than half full, he says. Since new keets are smaller than chicks, Garber places the feed on egg flats at first so that the birds can reach it readily.

He uses a 20 per cent protein broiler mash. Some growers prefer to use turkey starter. As the keets grow older, they are given some grain, usually oats. Occasionally corn meal is added to the mash for two weeks before marketing. This combination is used to step up weight and improve the finish of the bird.

Apparently, keets are less susceptible to diseases than chicks, but they are subject to Newcastle, pullorum and coccidiosis. The control measures are the same as for chicks. Mortality in a flock of keets is usually lower than in a chick flock. The main cause of mortality is smothering from piling up as a result of being frightened. Keets are similar to turkeys in this respect.

The demand for young guineas is on the increase, and growers are making good returns. In the Shenandoah Valley area, growers sold their birds for around 60 cents per pound this year. Of this per pound cost, approximately 15 cents was for feed, 15 cents for the keet, and five cents was for such items as litter, fuel, and labor. The returns above cost averaged between 50 and 60 cents per bird.

Most growers raise keets in confinement. Some, however, keep them in the brooder house for eight weeks and on range the remainder of the time. The Garbers follow both practices, depending upon conditions. The out - of - the - bag feed costs, of course, are reduced when the birds are ranged on good pasture. When the birds are sold from the range, the Garbers use a wire catching pen with covered top and sides. It is relatively easy to drive them into the enclosure, according to William Garber. "They are like sheep, when one goes in the others follow."

The larger growers of guineas generally sell their birds live weight. This practice is followed by David Lisney, jr., Rockingham County, Virginia, who grows around 1,000 birds at a time. But they usually reach the consumer after they have been killed, eviscerated and frozen. Some growers, perform all the services from keet to consumer—raising, killing, eviscerating, freezing and marketing.

Eight Breeding Tools

. . . to Help You Breed the "Perfect" Cow

Condensed From Guernsey Breeder's Journal

Lynn Copeland

ALL of us admire perfection. It is a goal toward which all ambitious people strive. But perfection is difficult to obtain in any line of endeavor and most particularly in the field of livestock.

It is much easier to paint a picture of a perfect cow or to model one from clay or to carve one from rock than it is to create one in flesh and blood. Since prehistoric animals have been domesticated, man has striven through the centuries to improve them and to make them better serve humanity. Many noted livestock breeders have devoted their entire lifetime to these efforts, and while we have profited from their work and will continue to strive to improve upon it, we have not yet reached perfection. Breeding livestock is both an art and a science, and the highest results cannot be obtained without considering it in this light.

Obviously, the task of creating a perfect cow in flesh and blood is so much more difficult than it is to create one on a canvas or in clay. The tools of the sculptor are a hammer and a chisel or a spatula, while the tools of a painter are oils and a brush. What tools do we have to use as livestock breeders and how may people use these tools?

Selection

The first tool that we may use is the tool of selection. Most of us have already employed this tool, sometimes wisely and perhaps sometimes not. It is a very important tool that many beginners misuse. Selecting the foundation of any herd is important. On countless occasions I have seen some man who may have made a success at law, medicine, banking, or some other endeavor, in starting out to build a good purebred dairy herd assume that there is not much to be learned about the dairy industry. The result is quite obvious. After a few

Reprinted by permission from Guernsey Breeders' Journal
Peterborough, New Hampshire

years this beginning dairyman gets disgusted and sells out.

In using the tool of selection, the health of the animal, the pedigree of the animal, her bloodlines, her production, the production of her immediate ancestry and her type and age all need to be carefully considered. For a beginner, the best way to use this tool is to ask the advice of some reliable breeder, field representative, county agent or extension dairyman.

Culling for Herd Improvement

The tool of culling is important. I think we purebred breeders are a little guilty of not using this tool as much as some of the breeders of grade cattle. We hold on to some poor animal just because we think she has a fancy pedigree. You have all heard the saying *"that any herd would be twice as good if it was just half as big."* This is certainly true.

Production Testing

Production testing and record keeping is one of the important tools available for any good dairyman. Before the advent of the Babcock test, the only method of production testing was the churn test. This was done by weighing each milking, setting that milk for the cream to rise, skimming off the cream, churning it, and weighing the pounds and ounces of salted butter. Most of these tests were 24 hours to seven days in length. The first time that such churn test records were published was in the *Country Gentleman* in 1882, or 70 years ago. With the coming of the Babcock test, several breed associations went enthusiastic over seven and 30 day butterfat testing. However, before long, breeders realized that persistency of production could not be measured with a short time test and that longer testing periods were needed. Then about the turn of the century all of the breed associations established their official testing programs and the tool of production testing really began to help us in breeding better cattle.

More recently we have begun to use this tool to better advantage and we are now realizing that we do not learn very much by just testing an occasional selected animal. In trying to measure the transmitting ability of a bull, it is just as important to know how many poor producing daughters that bull has as it is to know how many daughters he has that have completed records of over 600 or 700 pounds of butterfat. I like Advanced Registry testing, if we do not kid ourselves and our neighboring breeders by just testing a few hand picked, selected daughters of our bulls. The importance of knowing all of the facts is the one reason why Dairy Herd Improvement Association testing has grown so rapidly during the past two or three decades. With Herd Testing we

get a more complete picture about our herd and it helps us to really measure our bulls and to locate the good transmitting cow families within the herd.

After all, any production record on a cow has several values. First, it indicates the economic worth of that cow in the herd as a future producer. Second, a good record has great advertising value. Third, the record of a cow gives some information about the cow's own transmitting ability. Finally, and perhaps the most important value of production records, is the fact that the record of a cow helps to prove the transmitting ability of both her sire and her dam.

Classification Valuable Yardstick

The tool of classification is relatively new. However, it is an important one. Until we had the classification program, breeders had no satisfactory yardstick with which they could measure the type or the conformation of their animals. Of course, we had the show ring and the show ring is important. However, one of the best results of the show ring is in advertising and in promotion. The mere fact that a cow won second place in the three year old class at a certain local, district or state fair would not tell very much about the actual type of that particular cow. Perhaps there were only two animals shown in that class. Even if she won first place in a fairly large class, without knowing the caliber of the competition we still do not know very much about how good an individual that cow was.

There are many herds that are not able to show extensively on the show circuit. For these particular herds the tool of classification is important and valuable. For a relatively small fee, any breeder can get his herd classified by a nationally known judge and receive a certificate showing the over-all rating and also separate ratings on the different parts of the cow's anatomy. These records are preserved in the breed association offices and are published and made available to other breeders.

Any breeder who classifies and then really studies his analysis chart can learn a great deal about his herd and about the transmitting ability of his bull. He can estimate his bull's short comings in the transmission of type or conformation. Consequently, if his bull is showing up weak in transmitting certain desirable characteristics, that breeder knows that in selecting his next sire he needs to find a bull that will correct these faults. Classification is not expensive and is a tool that everyone should use. It can and will bring big results in herd improvement.

Laws of Inheritance

I have always believed that no one can satisfactorily breed cattle from records alone. However, I

also believe just as thoroughly that no one can do a good job of breeding cattle without records and without using these records intelligently. The science of genetics is relatively new, but with this tool men in other branches of agriculture have made tremendous progress.

From the study of the laws of inheritance we have learned that to a certain extent, at least, like begets like or the likeness of an ancestor. We have known this for years, but inheritance studies have shown us many other new important facts. For instance, we know that the production record of a cow, considered just by itself alone, is not a wholly reliable measure of that cow's transmitting ability, yet I have seen breeders go out and pay a high price for a bull calf just because that calf happened to be out of a cow that produced over 1,000 pounds of butterfat. We know there is some correlation between the record of a cow and the records of her daughters and the transmitting ability of her son. However, there is not enough correlation to use that record alone and to ignore everything else.

We have also learned that perhaps the most important consideration in the pedigree of a prospective young bull is that the young bull should be sired by an outstanding proved sire. If any particular bull has a sizeable number of daughters that are all uniformly good, both in type and in production, this is a very good indication as to his transmitting ability to his sons. Then, if we can get this young prospective bull out of a good brood cow that, herself, is a daughter of a really good proved sire, we will take a lot of the gamble out of a bull selection. As a breeder we also need to study the records of our own herd a lot more carefully than most of us do. Too many of us are using our good production records simply to sell breeding stock and not using them enough in analyzing our own herd and trying to locate and find out the good transmitting cow families within our herd.

Feeding

Some of you may say that feeding is not necessarily a breeding tool or a tool for herd improvement. Yet, if animals are not fed satisfactorily we cannot expect to obtain a good measure of either their conformation or their producing ability. Frankly, I have never seen anyone make a success out of the dairy business who was not first of all a good feeder.

This tool of feeding is first employed with our heifer calves, and here is one place where so many dairymen do a very poor job. We just do not grow our heifers out. The urge to grow is stronger at six months than it is at a year, and it is probably stronger at a

year than it is at 18 months or two years. Consequently, I doubt if any animal that is once stunted or starved will ever make as good or as big a cow as she would have if she had not been starved or stunted.

Of course, some breeders misuse this tool and feed too heavily. This can easily be done, especially with young heifers. I am convinced that many young heifers are injured each year by overfeeding. This causes fatty deposits in the udder that are difficult to remove later on. The secret of good feeding is to keep the animals growing, to keep them thrifty, and to keep them in good condition but not to get them fat. It takes careful watching on the part of a good feeder to do this well and to keep all of the animals in his herd in good physical condition. Some breeders underdo it and others overdo it. Both are harmful.

Management

Management is another tool that is important and yet costs little. For instance, I could give two men equal foundation herds with access to the same bull and with the same amount of capital available for feeding, and yet in the space of five or ten years one of these men would have a herd very much better than the other. Management would be the main difference.

When visiting any farm I am always interested in observing the appearance of the barn, the appearance of the cows, and the general setup as the indication of what kind of management or care the herd has been receiving. Are the cattle gentle and docile? The milking method is important and is a big management factor. So are such items as supplying adequate shade, water, fly control, comfortable quarters and giving the cows satisfactory rest periods between calvings.

There are so many management factors that it is almost impossible to mention all of them, but good management is so important that I hesitate to pass on without one or two more comments. Too often it is the universal impression that anyone can milk cows. I have seen some farmers who would not trust an expensive field hay chopper to the care of his hired help, and yet would turn over his entire dairy herd, worth several times more, to incompetent help on the theory that anyone can milk a cow. Likewise, I have occasionally seen wealthy men spend several hundred thousand dollars for a beautiful farm, then establish a good foundation of purebred cattle, costing many thousands more, and finally try to hire a $100 a month man to take care of this investment. It just can't be done. All of the other tools are of little use if we do not use the tool of good

management in our dairy operations.

Love for Cattle and Cow Sense

This final tool is difficult to explain. Some men are just good cow men with a certain cow sense and a love in their hearts for cattle that other men do not have. Such men can invariably get better results from working with cattle, and can do a better job of getting good production. A good cow man is born with a love of cattle in his heart. He may learn a lot from studying about production testing, classification, feeding methods, and the laws of inheritance; and yet if he does not really like to work with cattle he will not make much of a success in reaching perfection in breeding good cows.

One of the best dairymen I have ever seen made a regular habit of going out to his barn the last thing before bedtime and checking up on every cow, giving each one a little more clean bright hay and then a general checkup on the calves and, of course, all the maternity cases. This man told me once that he just loved to stand and watch his cows eat. When we were in the pastures his cows came up to him and he would involuntarily put his arms around the cow's neck and stroke her and pet her while he was talking about her. I felt that every time he petted one of those cows it just meant an extra pound or so of milk at the next milking.

So, we dairymen, instead of just having a brush and oil, or a hammer and chisel, have eight good tools that we can use. Pure skill and highest artistry are embodied in the creation of perfection in the dairy cow. We are heirs of a great heritage in the good cows that have been handed down to us by past generations of good breeders. Our responsibility now is to use these tools to the best possible advantage to improve our breed of cattle. In doing so, we will not only be making more profit from our own herd but we will be making a lasting contribution to the welfare of future generations.

Decline in the price of alfalfa seed of more than 50 per cent from last year should encourage more farmers to resume or expand alfalfa's use in seed mixtures for hay and pasture purposes where soil conditions are favorable. Purdue university agronomists disclose that price and supply of wilt-resistant alfalfa such as Ranger and Buffalo are favorable to their greater use in long rotations. Other legume seeds such as red or alsike clover and sweet clover are also down in price from last year. Lespedeza and timothy seed prices are 50 per cent higher than last year.

New Remedies for Bloody Scours in Pigs

Condensed From The Hormel Farmer

Dr. Lawrence Carpenter

EXPERIMENTS conducted at the Hormel Institute show that two arsonic acids can cure or prevent bloody scours in pigs of all ages. Weaned pigs experimentally infected with tissues from pigs sick with bloody scours do not get the disease if they are given drinking water that contains 400 mg of either 3-nitro-4-hydroxy phenyl arsonic acid or 4 nitro-phenyl arsonic acid per gallon for a period of 7 to 10 days.

Pigs that have bloody scours can be cured by drenching (forced watering) with a solution containing either of the arsenicals. Suckling pigs weighing 10 to 20 pounds should each be given a water solution containing 100 to 150 mg of one of the arsenicals; weaned pigs weighing 30 to 50 pounds should be given 300 to 400 mg of either compound as a drench. Do not treat at this level of dosage over three days or toxicity will develop.

Both of the arsonic acids increase the growth rate of weaned pigs when they are added to swine rations. However, the amounts used for growth promotion are much lower than those used to cure bloody dysentery.

Swine dysentery broke out in the Hormel Foundation herd about a year ago. It was first noted that diets containing arsenicals or an antibiotic feeding supplement containing aureomycin helped prevent the disease but did not give complete protection.

The Hormel Foundation herd is managed so that a sow farrows each day throughout the year. All equipment is used constantly and pigs of all ages are moved about almost daily. Under such conditions all pigs are constantly being exposed to swine dysentery and it is much more difficult to control the disease under this kind of management system than under farm conditions where the pigs are usually all about the same age.

Although the disease has not been eliminated from the foundation herd, it has been controlled. And it appears now that by using

diets containing two grams of aureomycin as an antibiotic feeding supplement (one per cent Aurofac) and 9,000 mg of 4-nitro phenyl arsonic acid per 100 pounds of complete feed, better results will be obtained.

Approximately 1,500 suckling and weaned pigs have been drenched with arsenicals and in practically all cases the symptoms of the disease have been eliminated with one or two treatments. Likewise over 150 sows have been treated satisfactorily with one or two drenches containing 1,500 mg of the 3-nitro compound per 400 pound sow.

In order to aid in controlling the disease it is important to sort out and drench all obviously sick pigs. The water for all pigs should be medicated. Rigid sanitation must be practiced. Burn or bury all dead pigs and infected manure or litter. Wash quarters with lye water. And if possible, move pigs to new quarters and allow infected premises to stand idle at least 30 days.

Swine dysentery is an insidious disease known by such names as bloody scours, black scours, black dysentery, bloody diarrhea, infectious hemorrhagic enteritis, and vibrio dysentery. If medication is not immediate, many pigs will die and those that do not die will be thin and gaunt and considerable time will be required to get them in condition again. The disease is easily recognized once it enters a herd. The pigs will first have a watery diarrhea. This is generally followed within 12 to 36 hours by the presence of blood and mucous in the stool. At this stage the pigs become gaunt in the flanks. Unless treated they become listless and do not eat or drink. It is a disease that will cause considerable economic loss if it is not treated promptly.

Tests Show Silo Best for Alfalfa

Most efficient way to harvest and preserve alfalfa for livestock feed is to put it up as chopped, wilted silage in tower silos, according to tests carried on over a five year period at Beltsville, Maryland. Results of the study were presented by L. A. Moore, United States department of agriculture.

Moore discussed four methods of harvesting and preserving alfalfa: Field curing, barn curing, dehydration and making silage. More labor and machinery were required to harvest rain damaged, field cured hay. It had the poorest feeding value. The tests showed that making wilted silage was the most efficient method of preserving the nutrients, followed in order by barn cured hay and field cured hay.

Fuller Brush Man Rings Bell in Cotton Harvest

Agricultural engineers use synthetic bristle to bridge gap between picker and stripper types of machines.

Condensed From Agricultural Engineering

TWO types of cotton harvesting machines are in commercial production and rather extensive use. Both are successful and satisfactory; both are failures. That paradox stems from diversity in the characteristics of the cotton itself, and in the conditions under which it is harvested. It is the stimulus for efforts to create a third type of machine, described in a progress report presented to the 1951 annual meeting of the American Society of Agricultural Engineers.

The type of machine called "picker" works well with cotton of high yield, open type of boll, long fiber and considerable vegetative growth, found in regions of high rainfall or under irrigation. The kind of machine called "stripper" works well in the high plains of Texas where the plants are small, fibers rather short, hard bodied, and easy to clean. Betwixt these kinds of cotton is the three-quarter to fifteen-sixteenth inch fiber as grown in Oklahoma and typical of about half the total cotton acreage. It comes closer to fitting the stripper method, yet conventional strippers are not generally satisfactory.

Stripping consists of causing the entire plant to pass between fingers, between a pair of rolls, or between a roll and a stripping bar. When plants have been frost-killed, the stalks and limbs become brittle, break easily. Broken pieces get away and lose cotton, or clog the machine. Big stalks wedge at the stripping point and uproot the plant, and if the stripping device is opened up to avoid this, part of the cotton gets away.

What the Oklahoma kind of cotton calls for is a stripper with slots that are wide for the stalks, yet snug for the cotton, and so gentle that brittle stems will not be broken. The agricultural engineers came up with the idea of

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St. Joseph, Michigan

brushes in the shape of rollers, facing each other as in a clothes wringer or corn picker. And it was the Fuller Brush Co. that came up with samples of brushes made of steel wire, tampico, palmetto and calabar bristles, and various combinations thereof.

The bristles take quite a beating, as they must "fade away" to let big stalks go through, yet bounce back with enough stiffness to strip the boll from the plant. A palmetto - tampico combination did pretty well, and later nylon was used, both alone and in combination with tampico. On some of the rolls the rows of bristles were straight; on others the rows spiralled around the roll to give an auger effect. The exact speed of rotation was not important, as long as it was fast enough to throw off the cotton.

In the 1949 season, harvesting conditions were ideal and the machine worked perfectly. It never pulled a single stalk, worked consistently without choking, and did a cleaner job than either a spindle type picker or a conventional stripper. In 1950 conditions were about as bad as could be. Heavy rains had produced much vegetative growth, the boll weevil had cut yields way down, and a premature hard freeze had embrittled both stalks and limbs.

A conventional stripper broke stems to such an extent that progress was impossible. The experimental "brusher" broke comparatively few limbs, but their fragments fouled up the air-suction conveyor and kept it from working, despite several attempts at improvement, including a forced feed into the main duct. As the season ended, it looked as if completely mechanical rather than pneumatic conveying would be needed to cope with such extreme conditions.

But the heart of the machine, the brush stripper, did a good job. It can be refined as to size and substance of rolls and bristles, and in diverse details. That part of the problem seems definitely licked, and the difficulty in getting cotton away from the rolls and into the wagon should not be insuperable. After all, it is only a conveying job.

Having proved its basic principle under most adverse conditions, the "brusher" can be expected to develop into an everyday implement under the competitive incentives of commercial exploitation. Its major blessings will be reduced costs and greater returns for farmers in something like half of the cotton growing acreage.

Weakness, bloody diarrhea and loss of weight are three symptoms of coccidiosis in feeder calves.

NEW SCHRADAN INSECTICIDE IS FED TO PLANTS TO KILL BUGS

New discoveries on how revolutionary new systemic insecticides work probably will permit their use on some 1953 crops

University of Wisconsin

POTENTIALLY at least, systemic insecticides are one of the biggest recent finds in farm science. Not poisonous when sprayed or dusted on plants, these chemicals are absorbed by the plant itself and changed into a powerful insect killing material. They are carried by the plant juices, so insects feeding anywhere on the plant are killed. Most other insecticides now in use kill only the insects which come in direct contact with or eat the chemical applied on the plant.

Up to now there has been one block in the way of their wide use. Because they actually become a part of the plant, the Food and Drug Administration (FDA) must rule on when and how it is safe to use them on crops.

Before the FDA can do this it needs definite knowledge of (1) how systemic insecticides do their work; in other words, just how they are converted within the plant, and (2) how to analyze plants for poisonous residues.

Research workers from all over the world have been hunting answers for this question. With the findings of University of Wisconsin research reported in this story, the Pure Food and Drug officials have most of the information needed for subsequent approval of a systemic insecticide named Schradan. It looks as if approval for some crops will be forthcoming this year.

Now, a team of Wisconsin scientists has identified the insect killing substance of Schradan and has provided methods of analyzing plant tissues for it. This insect killing substance is the first member of a new chemical family.

As it stands now, systemic insecticides may be far enough along for limited use on the cotton crop this year. Other crops will have to wait longer, though, until the danger of residues can be studied.

The research men have learned how the insecticide kills insects—by blocking an enzyme system that

enables nerves to transmit nervous impulses. A chemical builds up at the ends of nerves. The high concentration of this chemical kills the insect when the enzyme system is blocked.

The scientists identified this plant made insect killer by treating Schradan with chemicals until they had a product with about the same action and insect killing effect. Then this material was identified by mixing it with chymotrypsin—another enzyme that is blocked by the active insecticide. This treatment "trapped" the insect killing material on the chymotrypsin. The chymotrypsin could be analyzed chemically to find out what the substance was. After that, the actual insect killing material from Schradan treated plants and animals was purified by a chemical process called solvent fractionation, using as a guide both chymotrypsin and the cholinesterase enzymes. In that way it, too, was identified.

After carrying out hundreds of chemical and enzymatic assays these researchers decided that the insect killing substance was a new molecule that had never been recognized before. It also contained within its structure an entirely new arrangement of atoms — a group which chemists had not previously known could exist. They have named this group the phosphoramide oxide. The insect killing material is a phosphoramide oxide of Schradan. It is a million times more toxic to enzymes than Schradan itself. That makes it as effective as parathion —one of the newer phosphate insecticides.

This research in turn also supplied a way to analyze plant tissues for the active insect killer. Chloroform can be used to dissolve the insect killing substance from ground up tissues of plants that have been treated with Schradan. When it's treated with acid, the insect killing substance from the chloroform releases formaldehyde—a chemical not normally found in plants. The amount of formaldehyde released indicates the amount of the substance in the plant tissue. If no residue of the chemical remains in the tissue, little or no formaldehyde will be released. This is a rapid, simple and extremely accurate analysis procedure.

Such analysis is needed for officials to determine whether or not residues remaining in a crop sprayed with a certain amount of Schradan are dangerous to humans or animals eating that crop.

Systemic insecticides have many advantages over the insecticides we have now. They can be used to treat seeds, so the plants growing from the treated seeds can resist insect attack. Seed treatment would be easier than field spraying in many cases.

Systemic insecticides can be ap-

plied after planting, too. No matter what part of a plant they are sprayed upon, they'll affect insects feeding on any part of the plant. That way, there's little need to worry about complete spray coverage.

Schradan is soluble in almost any liquid, so it won't be as difficult to find a solvent or carrier as it has been with some of our other insecticides. Schradan can be used with most other insecticides or chemicals without cutting down their effectiveness. This isn't always true of our present insecticides.

There's less danger involved in applying systemic insecticides than there is in applying some of the other insecticides. And Schradan kills only the insects which feed upon the plant—not their natural enemies and other helpful insects that do not eat plant tissues. An ordinary insecticide may kill all insects in the sprayed area without distinguishing friend from foe.

Schradan is a very stable chemical—it doesn't lose its insecticidal powers in storage because it isn't converted to poison until it's in the plant. When it is in the plant, it has a long lasting effect.

The scientists have also tested the effect of Schradan's insect killing material on animals. They found that animals can produce the same toxic substance from Schradan. That means recommendations for using Schradan must be based on analysis of plant tissues for two things—not only the insect killing substance, but also the Schradan which is not poison until converted by animals or plants. In this way, the possibilities and limitations in the use of systemic phosphate insecticides can be evaluated adequately.

Systemic insecticides are an advanced step in insect control research. The first insecticides were simple stomach poisons like paris green, arsenic and nicotine. Then, a few years ago, an entirely new kind of insecticide was discovered — the synthetic organics like DDT, chlordane, parathion, and a host of others. These chemicals gave insect control such as the world had never known. A United States department of agriculture official estimates that DDT alone has prevented five million deaths and 100 million serious illnesses since it came into common use 10 years ago.

The organic phosphates had the advantage of being more poisonous to insects. The new systemics, if they're approved for use, have the added advantage of extreme ease of application.

Some plants contain natural materials that will repel or poison insects. Tobacco, pyrethrum and certain weeds are examples of insecticidal plants. Systemic insecticides now enable us to give this important insecticidal quality to other plants.

Good Turkey Ranges Bring Higher Profits

Facts and Figures Show How Growers Can Cut Costs With Fertilizers and Range Management

Condensed From Turkey World

Prof. P. H. Margolf

Pennsylvania State College

NO PHASE of turkey raising offers greater opportunities for cutting costs, increasing profits and growing better birds than the proper use of range and succulent greens. Grasses and legumes contain many factors known to be beneficial to poultry. In addition to these known factors, greens are rich in unidentified nutrients. The protein content of succulent greens may be as high as that of skimmilk. The mineral content is also good.

Since pasture for turkeys is so desirable, how can we create a good environment for the growth of this green feed? There are four principal environmental factors that affect pasture plants. The first two—moisture and temperature—are determined largely by geographical location and conditions. The other two—soil fertility and grazing management—are up to the turkey grower himself.

Selecting a range mixture and getting it established is pretty much an individual problem. Much land needs phosphate, lime and potash. Exactly how much is needed, and just how and when it should be applied, depends on many factors. The answers to these questions can best be determined by consultation with the local county agent, conservation service field men or any other qualified authority who can come to your farm, study the situation, get soil tests, and make on the spot recommendations.

If you have had poor luck getting pastures established, by all means take time to get expert advice on soil preparation, nurse crops and mixtures, and have tests made before you spend any money for seed. A poverty grass pasture may be changed into a productive Kentucky Bluegrass and white

Reprinted from Turkey World
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clover pasture if the necessary plant nutrients are added.

Thin, droughty, poorly drained soils are not the best adapted for pastures. However, some progress is being made toward the discovery of plants that will do reasonably well on such soils. Also, there is more and more knowledge being gained on managing such soils.

Pasture on droughty soils or steep slopes may not be economical to improve. On the other hand, there are many acres of potentially productive pasture land on which Kentucky Bluegrass and white clover could profitably be grown if the necessary lime and fertilizer were applied.

Grass by itself cannot produce the best yields unless an adequate and ready source of nitrogen is supplied. Fortunately, birds grazing on some land will supply through their droppings the necessary amounts of this nutrient.

A legume grown with grass produces nitrogen. The nitrogen supplied by the legume plus the nitrogen supplied through the droppings of the birds may seriously weaken the legume by making it possible for the grass to prosper too well.

To provide ample succulent and nutritious forage, some of the larger growing and deeper rooted hay type plants can be used. They would include ladino clover, alfalfa, orchard and bromegrass. These plants are able to grow quite well under summer conditions, too. These pastures require careful growing management and a liberal investment in fertilizer. They are usually located on potentially productive soils where good returns can be expected.

Orchard grass is just now coming to occupy the place among leading forage grasses that it truly deserves. It is only in recent years that the state agricultural experiment stations have come to recognize its potentialities, especially as a pasture crop.

The demand for a taller and more rapidly growing grass has brought out the importance of orchard grass. Its toughness, leafiness and ability to establish itself on relatively poor soils and in humid temperatures are widely known. Orchard grass is a long lived perennial, has a typical bunch type of growth producing no stolons. This grass never forms a complete sod, and the tendency to form coarse bunches can be controlled by careful grazing management.

How about bluegrass? With the possible exception of timothy, bluegrass is the most widely known grass in America. Its wide distribution gives adequate testimony of its adaptation to many soils and climates. The fact that bluegrass is one of the richest of grasses in protein helps explain the fondness for it shown by cattle.

Nitrogen fertilizer has a certain appeal to this bluegrass in that it brings quick results. A four acre bluegrass pasture, treated with 125 pounds of ammonium nitrate to the acre in the early spring, yielded 4,531 pounds of dry matter to the acre. A similar untreated pasture yielded only 2,734 pounds. The increase from a modest amount of nitrogen was nearly 66 per cent.

In other experiments, bluegrass showed significant increases over 14 other grasses to absorb minerals, especially phosphorus.

Kentucky bluegrass ranks as one of the most palatable pasture grasses. It starts its growth early in the season, and the tough sod formed by this grass is capable of withstanding heavy grazing and trampling.

What advantages does smooth bromegrass have? Bromegrass sown in mixtures with legumes, and properly managed, provides excellent pasture. The value of such pasture is that it yields an excellent source of protein for livestock.

What about Reed canary grass? Reports indicate many successful stands, and yields are high. No disease, serious enough to attract any attention, attacks this grass, and at present, it is troubled very little by insects.

Reed canary does best where the climate is moist and cool, but it is not sensitive to heat or cold. It makes its best growth on fertile, moist soils, but will make excellent growth on loams and clays of good fertility. Although naturally a moist or wet land grass, it makes very good growth on high, well drained, productive soils if supplied with ample moisture for spring and early summer growth. Its long life, long growing season, and the large quantity of very succulent, palatable forage produced, makes it a valuable pasture plant where it thrives. Reasonably close grazing improves the quality of the pasture.

Pasture management is important. A common practice is to crowd too many birds on a given area. Limit the number of birds on the area so that the herbage will be adequately eaten, but not grazed too closely. Daily moving of roosts, feeders and waterers will limit and distribute the area over which the birds graze. Turkeys tend to graze near the feeders and roosts.

If you start the flock at one end of an area to be grazed, it should take you about three weeks to have the birds moved back to the starting end of the area. This rotation should be repeated seven or eight times during the year. This method of management will provide ample succulent green feed all the year round. This frequent moving also aids in disease control.

Here are some do's and don'ts.

(1) Provide an adequate ground coverage of the herbage grown. (2) Don't pasture too many birds to the acre. (3) Use enough birds to keep the foliage clipped, so growth will come on and provide succulent pasture. (4) Move all equipment often; in fact, this is a must to maintain the other factors mentioned.

practically all the mortality. The results indicate that daily moving of equipment prevents an acute outbreak of this disease.

Do annual crops have a place as turkey pasture? On an annual planting basis, soybeans, buckwheat, rape, corn and sunflowers are used to provide pasture and shade for turkeys. Some growers

Results of seven years study with orchard grass permanent pasture for White Holland turkeys differing in intensity of grazing.

	1945	1946	1947	1948	1949	1950	1951
Number of poults stocked per acre							
Light Grazing	50	75	80	77	88	75	75
Heavy Grazing	100	150	150	148	176	150	150
Mortality: Per cent							
Light Grazing	9.8	1.5	8.2	7.7	11.8	3.3	3.9
Heavy Grazing	7.2	7.4	7.4	6.5	11.6	4.0	3.7
Pounds turkey produced per acre							
Light Grazing	531	709	786	936	1106	952	986
Heavy Grazing	911	1231	1702	1887	2198	1869	1893
Pounds of feed to produce one pound of gain							
Light Grazing	5.0	6.7	7.0	5.3	6.0	5.9	5.2
Heavy Grazing	5.1	6.7	6.5	5.4	5.6	5.9	5.2
Number of days on range	144	123	131	143	151	132	146
Age of poults when areas were stock (Days)	83	103	92	87	73	82	64

How many turkeys can you expect to range per acre? From observations made during this experiment, it would appear that 150 turkeys can be successfully grown on permanent pasture for seven successive years. This would hold only if adequate ground coverage is maintained at all times and a system of grazing followed whereby all shelters and equipment are moved daily. Chronic blackhead was responsible for

use these to supplement the second cutting of timothy and/or clover. If turkeys are hatched May 1, they will probably go to range in the early part of July and are started on a second cutting of clover.

Buckwheat, of the common Japanese variety, is readily harvested by turkeys when the grains are fairly ripened. Buckwheat is usually sown in May or late April at the rate of six pecks per acre.

This should make it possible for the plants to bush out and so give more foliage for the birds to eat.

Rape or soybeans can be sown in June. Soybeans will be of sufficient height to provide adequate greens for the birds during October. Rape will remain succulent during November and December.

Sunflowers and corn planted in strips will provide shade and act as a fence or barrier to control the turkeys. Fields planted to soybeans or rape, and used for pasture, are likely to get muddy in the rainy, fall season. However, if rape or soybeans are drilled in rows and perennial rye grass sown in between the rows, much of the objection from muddy fields will be avoided.

Crop rotation programs, with pasture for turkeys from the second growth of the hay stubble, are a common practice. Since corn follows the next year, the fertility added through the droppings of the birds increases the productivity of the land. Thus, turkeys in a good rotation plan are able to play their part to maintain high fertility and good, physical condition of the land.

Grass is good for turkeys, and turkeys are good for the land!

Why Pork Market Has Slipped

The housewife is looking for lean meat these days and that kind of pork hasn't been available in retail stores. Hogs are purchased in carload lots to a greater extent than beef animals and there is not enough of a price spread for different quality.

Those are some of the reasons, among several, for slip of pork prices, according to Dr. Clayton P. Libeau, extension marketing specialist at the University of Nebraska.

He says farmers would not produce lean hogs even if they could because market prices do not offer a high enough premium for lean hogs to make it worth while. He pointed out that the price spread for different quality hogs is not usually greater than $2 a hundredweight, while for cattle it is much more.

And, he says, incomes are relatively still high and people continue to prefer beef. They pass up pork cuts that contain a lot of fat or lard. Lard sells at 12 cents a pound at retail and hams cost approximately 60 cents a pound. This is the difference in price that housewives pay for lard and lean pork. Poultry, too, he says, now is presenting stronger competition to pork. Turkeys and chickens are marketing attractively and draw the housewife's eye. — *University of Nebraska*

Farm labor now costs four times what it did 20 years ago.

How to Handle CORNSTALKS

Condensed From The Rural New-Yorker

Myron A. Bachtell

CORNSTALKS have become more or less of a problem on thousands of farms. The modern mechanical corn picker permits the corn crop to be harvested in a fraction of the time formerly required for cutting, shocking and husking, but the mechanical process leaves the cornstalks in the field where their influence may be both good and bad, depending on how they are subsequently handled. On the one hand they may tend to exert a stabilizing effect on the long-time fertility level; on the other hand they may tend temporarily to retard the growth and yield of the following wheat or oats crop.

Chemistry of Cornstalks

Cornstalks contain about 50 times as much carbon as nitrogen and thus classify as carbonaceous material. This is in marked contrast to leguminous plants where the carbon-nitrogen ratio may be as low as 12 or 15 parts of carbon to one part of nitrogen. The cereal straws, and even that from the soybean seed crop, have nearly as wide a carbon-nitrogen ratio as exists in cornstalks. This difference in carbon-nitrogen ratio is the reason why crop growth may be depressed by plowing under cornstalks, but stimulated by legumes.

The decay of either material is caused by bacteria. Because these tiny and very active organisms cannot multiply and work without nitrogenous food, a competition for nitrogen develops between them and the growing crop. Clover residues and the soil may contain enough nitrogen to meet the needs of both. Cornstalks, on the other hand, have so little ni-

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New York City

trogen that conditions are likely to prevail where either the bacteria or the growing crops fail to get all they need.

When this occurs, the crops are most certain to be the losers. Reduced yields may result, especially on light colored soils where the nitrogen supply is naturally low. It is, of course, true that the bacteria eventually die and release the nitrogen they have used, but the crop was being deprived of its use during a critical period in its development.

Cornstalks Need Nitrogen

The livestock nutrition investigator studying the feeding value of corncobs, and the agronomist studying the fertility value of cornstalks, find a parallel situation. The efficient digestion of corncobs by ruminants depends on the supplemental feeding of nitrogen (as protein), and the efficient utilization of cornstalks in the soil requires nitrogen feeding of the bacteria which cause the decay of cornstalks. With an adequate supply of nitrogen, a certain amount of stable humus is formed when cornstalks decay; with an inadequate supply the net products of decay are largely water and carbon dioxide, both of which escape into the air without any lasting benefit to the soil in which the decay occured.

In farm practice there are three methods of supplying nitrogen for the better utilization of carbonaceous residues. When leguminous forages and high protein concentrates are fed to livestock, considerable nitrogen is secreted in the urine and becomes mixed with the carbonaceous bedding materials. This method cannot apply to cornstalks when that part of the corn crop is left in the field.

The common method of supplying nitrogen (where cornstalks have not been removed) is to rely on the remnants of leguminous green manures or legume sods which still continue to undergo simultaneous decay with the cornstalks. Considerable uncertainty in this source of supply can easily be visualized from the fact that the corn crop itself had first chance at the nitrogen from these leguminous sources. Added to this is the equally obvious fact that the cornstalks are going back to the soil soon after the corn has done a fairly efficient job of utilizing the more readily available nitrogen in the leguminous green manure crops and sods.

Oats yields, on certain plots in the Sweetclover for Green Manure Test at the Ohio agricultural experiment station, indicate that the remnants of green manures often may not supply sufficient nitrogen for the most satisfactory utilization of cornstalks. A corn-oats rotation is used in this experiment. On those plots where no leguminous green manure has been plowed down for corn, the

oats yielded six bushels less per acre over a five year period, where the cornstalks and oats straw were returned, than they did where these residues were removed. In 1951 the reduction in oats yield was 14 bushels per acre. On the plots where fair sweetclover had been plowed down as green manure for the corn, the loss in oats yield was cut to less than two bushels for the five year average and to nine bushels for the 1951 crop. In 1951 the early season was cool and wet, the color of the oats was poor and the yield was affected more than average by the greater ability of the bacteria to utilize the limited supply of nitrogen.

The remnants of the leguminous green manure crop lessened the loss in oats yield, but did not completely eliminate the evil effects of the competitive struggle for nitrogen between the oats and the bacteria of decay. The carryover of nitrogen for the oats crop should be greater from excellent alfalfa-grass and ladino-grass sods than it is from a green manure crop of sweetclover. This is especially true if the sweetclover makes only a rather mediocre growth.

Apply Commercial Nitrogen

The modern method of overcoming the depressing effects of cornstalks on the succeeding grain crop is the proper application of commercial nitrogen. This method was used in the crop residues experiment which was conducted at the Ohio station over a 16 year period. The rotation in this test was corn, soybean hay, wheat and clover. Although this rotation contains two legume crops, it is not a particularly good rotation from some standpoints. Crop yields were good (but not high) where all crops, except wheat grain, were passed through covered feeding pens and the manure returned. Where the excreted nitrogen from the digested legume crops did not get back in the form of manure, and the cornstalks were plowed down prior to the soybeans, the effect of the cornstalks was negligible. The yields of other crops were neither decreased nor increased to any significant extent.

On certain plots in this experiment the carbonaceous cornstalks and wheat straw were returned after having gone through the compost pile with as much nitrogen and limestone as was considered necessary for the production of artificial manure. On still others the same amounts of stalks, straw, nitrogen and limestone were plowed under without being previously mixed. The results from putting these materials into the soil separately were slightly better than from composting, and practically as good as where the residues were used for bedding. Thus the non-inclusion of corn-

stalks in the winter livestock management plan does not prevent their profitable utilization. However, it does seem to increase the desirability of purchasing nitrogen.

A rather fine distinction, and often a difficult one, has to be made between the need for additional nitrogen that is caused by the return of carbonaceous residues and the need that exists to supply the routine requirements of satisfactory crop yields. This latter need may be large because of a general inadequacy of the legume program or the sequence of the crop rotation. Because of this, the application of commercial nitrogen justifiably may at times be much larger than the amount required to offset the depressing effect of the cornstalks or other carbonaceous residues. For this latter purpose alone, the application of 20 pounds (or a little more) of nitrogen for each ton of carbonaceous residue is satisfactory. Thus the acre application may result in the use of as much as 200 pounds of sulphate of ammonia or 125 pounds of ammonium nitrate.

Cornstalks Conserve Potash

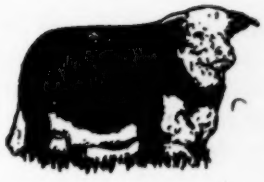
Cornstalks add materially to potash conservation. Two-thirds of the potash that the corn crop uses stays in the field with the stalks. The residue from an 80 bushel crop contains approximately 60 pounds of potash, an amount that compares with that in six tons of manure or in 300 pounds of fertilizer containing 20 per cent of potash. A manure or fertilizer application of this size usually is suggested as desirable for a year of meadow. Thus the return of cornstalks to the soil instead of taking them out of the field is quite a conserver of potash for the meadow crops that follow later in the rotation.

Cornstalks conserve the supply of phosphoric acid to a lesser degree since about four-fifths of the total used goes out of the field with the grain. The residue from an 80 bushel yield contains seven pounds, or approximately as much as is carried in one and a half tons of manure. The combined value of these two nutrients at present fertilizer prices would be about $6 per acre of cornstalks. While cornstalks are too valuable to waste, they are not valuable enough to buy and spread on the land, largely because of the labor and hauling factors.

And one last point in favor of cornstalks. They have an erosion protection value when they lie flat on the ground or have been partially incorporated into the surface by disking.

A hen out of production for some time and not getting ready to lay again soon may be recognized by the shriveled scaly comb and wattles, small dry vent, hard abdomen and close setting pubic bones.

How to Breed Productive Beef Cattle



Condensed From The Hereford Journal

Prof. H. A. Stewart

North Carolina State College

BEEF cattle producers want cattle that produce beef efficiently, yielding cuts of meat of the size and quality desired by the consumer. Cattlemen are interested in putting meat on the table, either directly as animals for slaughter, or indirectly, through the progeny of the breeding animals. Profit from the beef enterprise is measured in numbers —numbers of dollars.

A major portion of the increase that has been made in improving the efficiency of beef cattle production has come through changes in methods of management, improved pastures and feeding practices, and disease and parasite control. These are the areas where the most rapid improvement in beef production is possible. These changes in environment do not become a part of the animal; hence, they are temporary.

Improvements made through breeding are slow but permanent, because the hereditary materials of the animals are changed. But, improvement through breeding is essential to increase the inherent efficiency of individual animals and to permit them to make better use of improved management practices. Before an intelligent beef cattle breeding program can be initiated an analysis of the component parts of the beef production enterprise is needed.

The successful beef producer seeks:

(a.) A high percentage of cows of breeding age to calve within a two to three month period each year, as the enterprise is usually conducted commercially.

(b.) Each cow to be capable of weaning a heavy calf without the help of a nurse cow.

(c.) Calves exhibiting the ability to make rapid gains after

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weaning, either on dry lot feeding or on roughage and pasture.

(d.) The breeding herd to produce a calf crop free from hereditary abnormalties such as dwarf calves, cancer eye, large or fused teats, and with inherent resistance to such common cow and feedlot troubles as bloat, foot rot and pink eye.

(e.) Conformation of the calves to reflect the desirable shape and cuts capable of demanding the highest value, but selections for conformation must be in economic balance with the other production considerations in the enterprise.

Each of these measures of performance can be expressed in numbers.

Production testing is the regular and systematic recording of information regarding the performance of each and all individuals in the herd.

Production testing is simple:

(a.) Each individual in the herd is permanently identified.

(b.) Specific weights and estimates of market quality are made and recorded.

(c.) These weights and estimates are used as guides to more effective selection and culling in the herd.

Individual identification is possible through the use of numbered neck chains, horn numbers, ear tattoos, ear notches, or brand numbers. The specific measurements and weights to be taken are determined by those factors affecting economic return: 1, Percentage of calf crop; 2, weaned weight of calves; 3, gains made after weaning, and 4, market quality of cattle when sold.

The calf crop at weaning represents the financial return for the total cost of maintaining the breeding herd for one year. These maintenance costs include interest, taxes and risk, as well as feed and bull cost, fences and labor.

If the total cost of keeping each cow for one year is $100, the cost of each weaned calf, depending on the per cent calf crop, will be:

Cost Per Calf	Percentage Calf Crop
$100	100
111	90
125	80
143	70
167	60

The period during which a cow is capable of becoming pregnant is short. To assure a good calf crop it is necessary that all cows be bred to fertile bulls. Heat usually lasts 10 to 18 hours, with great variation in some individuals. Slow breeding bulls may contribute to a small calf crop. Length of time since calving, general condition of the cow, and the ability to detect cows in heat when hand mating is used affect the number of calves dropped.

The cost of each calf at weaning is determined not only by the

percentage calf crop, but also by the average weight of each calf. As the average weight per calf at weaning increases, the cost per pound decreases.

If the total annual cost for each cow amounts to $100, the cost per hundred pounds of weaned calf, depending on per cent calf crop and the weaned weight of the calf, will be:

Per cent Crop Calf	Average of Calf (Lbs.) Weaned Wt.	Cost Per Cwt. of Calf.
100	600	$16.67
	500	20.00
	400	25.00
80	600	20.83
	500	25.00
	400	31.25
60	600	27.78
	600	33.33
	400	41.67

Data from North Carolina feeder calf sales indicate that as weight increases market grade also increases. So good milking cows are needed in a sound beef producing program.

Because all calves in any herd are not the same age, and, since they are usually weaned at the same time, it is desirable that they be appraised at a constant age. The six month weight of the calf gives a good estimate of the suckling ability of the cow. This weight is more accurate than comparisons of weaning weights. Bull calves are usually about 30 pounds heavier at weaning than heifers. This must be considered in selecting or comparing cows for calf raising ability.

Gains Made After Weaning

Fast growing breeding cattle tend to produce fast growing calves. The effects of the milk and feed the calf receives before weaning extend into the period after weaning. For this reason it is necessary to measure the gains after weaning over a period of six months or more if the calf is on feed, and over a period of one year if on roughage and pasture.

Feedlot gains or efficiency of feed utilization cannot be predicted from the type or conformation of a calf. Calves of dairy breeding may grow as fast and as efficiently as beef bred calves.

Feed and labor charges make up most of the costs in growing or feeding out cattle. Fast growing cattle reduce the labor cost per pound of beef produced. This cost is further reduced because fast growing cattle convert feed to beef more efficiently than slow "doers."

Market quality, or selling price, reflects breeding conformation and finish. Uniformity of size and color may also affect price on groups of cattle.

Precise specifications for quality, type or conformation, and finish cannot be made. USDA grades for feeder and slaughter cattle, however, offer a guide to

the relative merit of individuals. These grades may be readily converted into numerical scores for use in selection.

Prices of cattle on-hoof indicate that on the average good cattle sell for about 10 per cent less than choice, and that each succeeding lower grade sells for an additional 10 per cent less. Thus a 1,000 pound choice steer has about the same total value as an 1,111 pound good, or 1,250 pound commercial steer.

Summary of the Situation

In a calf producing program the gross cash return per cow saved for breeding is the product of:

The percentage of calf crop *times*

The average weaned weight per calf *times*

The market grade or selling price per pound of calf sold.

In a feeding program the gross cash return is: The final weight times the sale price.

Final weight is dependent upon feedlot gains. Sale price depends on conformation, condition and quality.

Improvement in beef cattle productivity is to be expected if selections are made for traits of economic importance, such as: Percentage calf crop, weaned weight of calves, gains made after weaning, and market quality of cattle when sold.

Such a program requires a system of record keeping, a scale, and the ability and willingness to put a value score on breeding animals kept and on calves produced in the herd. The recorded information then must actually be used in the selection of breeding animals, if any tangible results from the program are to be realized.

Cattle Graze Cross Wind

The popular belief that cattle ordinarily graze with the wind in winter and into the wind in summer is not necessarily true except in severe weather.

A three year study by University of Nebraska scientists in the sandhills showed that cattle during the grazing season traveled with or against the wind only 10 per cent of the total grazing time. About 90 per cent of the grazing was done cross wind. A knowledge of the way cattle graze on pasture is considered essential for the application of range movement and other conservation practices.

Chickens need twice as much water for their weight as beef cattle, hogs or sheep.

Aiding El Salvador

. . . Where They Still Plant Corn as They Did Before the Spaniards Came

Condensed From The Nation's Agriculture

Vories Fisher

CORN once meant the difference between life and death in America. In 1621 the colonists of Plymouth survived the hardships of their first New England winter only because friendly Indians provided them with enough corn to keep from starving to death. When spring finally came, those same Indians taught the colonists how to plant and cultivate this new world crop.

That was America's first experience with technical assistance, though early Americans called it just plain "neighborliness."

Today, in many parts of the world, corn is still the difference between life and death and America is doing much to keep others from starving.

In El Salvador, for example, which is just a handful of ground in Central America about the size of Maryland, more than two and a half million people try to raise enough corn, beans and rice to keep alive. The population is growing tremendously every year, and the amount of land available for food crops is getting less, due to harmful farming practices and lack of erosion control.

Increasing corn production is not the only kind of help the El Salvadoreans need but it's the first problem. Once there's enough corn, which is the principal food crop, something can be done about other food needs.

They still plant corn in El Salvador the same way they did back in 1525, when the Spanish came.

They push a pointed stick into the ground when the moon is right and then drop the seed corn into the hole. Nature takes over from there and sometimes washes out the corn in the heavy downpours of the rainy season, even before it has begun to sprout.

The corn that does hang on stands a good chance of burning up during the six months of dry season that follows the rains, or a swarm of locusts may get to it before the farmer. Between times, diseases and insects do substan-

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Chicago, Illinois

tial damage.

American neighborliness in the face of these problems began in 1942, when the United States department of agriculture entered into an agreement with the ministry of agriculture of El Salvador to establish a small agricultural experimental station at Santa Tecla.

The "Centro Nacional de Agronomia" as it is called, was established to teach Salvadoreans modern agricultural methods, to improve crop strains and yields, and possibly, in an exchange of information and experimentation, to learn something that could be passed on to American farmers.

County Agents

With technical assistance under the Point Four program, the Centro started a wider field of activities including irrigation and erosion control, development of research and extension centers, establishment of county agent offices and several large demonstration farms and experimental stations. During the last year, the United States contributed $91,292 to this program while the El Salvador government put up $850,000.

Efforts were immediately concentrated on raising corn yields, since corn is the most important food crop.

Irrigation is the most immediate need. It seems a simple matter to teach farmers how to bulldoze earth, check dams to trap the plentiful rains of the wet season, and to construct simple irrigation trenches to use that water later. Except no one knew how to drive a tractor.

So the Centro had to postpone irrigation for a bit and teach Salvadoreans about farm machinery. Introduction of modern agricultural methods had to begin with a tractor school.

The tractor school term lasts about three months. Students who, in some instances, never have seen a tractor before, learn how to drive it, take it apart and put it together again. After that they learn how to use other farm machinery. No fees are charged, the government providing the equipment and land for class uses (which also gets turned into demonstration farming) and students, currently limited to about 15 each session, must feed and house themselves.

It will be a long time before tractors replace the ox and primitive wooden plow of the Salvadorean farmer. But the tractor is ushering in a new kind of agriculture for El Salvador, an agriculture based on science and machinery and "know how. But also based on that good old American tradition of "neighborliness."

New Hope for Dryland Pastures . . .

RAMBLING ALFALFA

Condensed From Crops and Soils

O. S. Aamodt

WHAT about the new "rambling" alfalfas? Are they true grazing types which will withstand severe drouth and can be grazed without injury?

These and similar questions are being asked in many sections of the country. Although there are about 18 million acres of alfalfa in the United States today, it is evident that farmers would like to grow even more if suitable varieties can be found for those areas where present varieties are not well adapted.

A legume capable of persisting under the climatic and grazing conditions in the Great Plains would be a major contribution to forage production in that region. Nitrogen deficiencies, which now limit the production of grasses in this area, could be corrected by an associated legume. Furthermore, the grasses are usually low in protein during summer, fall and winter. A legume would add to the nutritive value, particularly protein content, of the forage.

During the past 30 years, plant breeders and seedsmen have concentrated on making alfalfa productive under the intensive farming conditions of irrigated and humid areas. It is only within the last few years, however, that attention has been turned toward finding a legume for the 200 million acres of native grass and abandoned farm land in our western states.

Many of the native legumes which managed to persist under limited use by wildlife and light grazing have been reduced by heavier grazing to a point where they contribute little to forage quality or soil improvement. Agronomists and seedsmen have carefully searched both this group of native legumes and those introduced from foreign countries for species adapted to grasslands of the west.

This search offered little encouragement until the new rambling alfalfa began to show promise of filling this great gap in the

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2702 Monroe Street, Madison 5, Wisconsin

western grazing mixtures. These alfalfas have grown in various parts of the world for centuries without attracting any great amount of attention.

One of the first rambling alfalfas to attract attention in the United States was introduced from Siberia by Prof. E. N. Hansen, a well known plant explorer.

Unfortunately, it was brought to public attention in a period when our agriculture was interested in production of cash crops, not in soil improvement and better forage plants.

With the coming of the drought period in the 1930's, people recognized the immediate need for grasses and legumes for soil improvement and forage production. Earlier grass introductions, such as crested wheatgrass and the bromegrasses which had also been pushed aside as curiosities, were revived and developed as key materials in the new soil improvement and conservation programs. For some reason, the revival of alfalfas adapted to western soil conditions was further overlooked until the 1940's, when it became increasingly obvious that a legume was needed to keep the grasses vigorous and the soil productive.

About 1948, Dr. M. W. Adams, among others, took a renewed interest in Hansen's rambling alfalfas. The area where the original plantings were made had been farmed and used for a golf course for nearly 40 years, but many plants managed to survive.

A check of the South Dakota farmers who received seed in the early 1900's uncovered fields of the original seedings. Forty years of drouth, hot summers, cold winters, overgrazing and cropping had passed, and still the hardy plants flourished, even through the "Big Drouth" of the 1930's. Seed stocks have been harvested from some of these naturalized stands of hybrid alfalfa, and plant breeders are developing the superior types into new varieties.

When A. C. Dillman, an associate of Hansen, moved to a new station at Mandan, North Dakota, he took some packets of seed with him. A few years ago some of Dillman's packets of alfalfa seed dated 1905 to 1909 were found in the seed room at Mandan. As much as 50 per cent of this seed germinated after being stored for nearly 45 years, and plants are now under observation at various field stations. Seed supplies are being increased at the Mandan station.

A thorough search of the old plots and for possible stray plants both at Mandan and Dickinson in North Dakota, revealed plants in old fields, among trees and shrubs in windbreaks, and along fence and telephone lines.

One of the farmers outside of

South Dakota who received some of Hansen's seed in 1908 was G. E. Yoder of Sunnyside Desert, Idaho. When he planted this seed with other alfalfas, natural hybridization produced a local composite variety. Farmers of that area found the new variety well adapted to their 10 inch annual rainfall. Developed on the Seven L Ranch, the variety was named Sevelra.

Siberian alfalfa from another source also found its way into the west. About 1942, Prof. G. R. Hyslop, of the Oregon experiment station, answered a call for help in eradicating a "bad weed." The weed had been plowed under every year since 1925, but even with only 11 inches of rainfall, it managed to persist. Hyslop found the weed to be a relatively vigorous, rhizomatous, blue flowered alfalfa with the crown set close to the surface of the soil.

The original seed reportedly came from a seed company in Wisconsin which had introduced a number of seed stocks from Siberia and distributed them in small packets to farmers in Wisconsin. One of the packets was passed on to a farmer in Klamath Falls, Oregon. He planted the seed and maintained the alfalfa until he disposed of the farm in 1925. The new owner, being unaware of the nature of the plant, thought it a weed until informed otherwise.

When E. F. Burlingham, Forest Grove, Oregon, purchased the farm, plants and seed were made available to a number of experiment stations for study. It was soon evident that the alfalfa had real possibilities as a range forage. Some of the most promising rhizomatous plants from this stand had a spread, with underground roots, of approximately 12 to 15 feet. During the developmental years, this material was often referred to as "Oregon Creeper," or "Burlingham Creeper." It has now been officially named "Nomad." A foundation field has been established, the variety is being certified, and limited amounts of seed are being distributed commercially.

These Siberian alfalfas found their way to Alaska, too, but only to "get lost" for a time—just as in the Dakotas.

In 1946 a survey of Alaska's agricultural resources revealed a field of creeping alfalfa plants growing adjacent to the Yukon river at Rampart. Rampart, once a booming gold rush town of 10,000 that had dwindled to a mere six hardy individuals, was the site of a branch of the Alaskan experiment station in 1914. No other evidence of the station's plantings remained; yet the yellow flowered Siberian alfalfa flourished in competition with native vegetation, even though the permafrost (permanently frozen ground) was

within 8 to 10 inches of the surface.

The amazing fact is that alfalfa grew vigorously over permanently frozen soil with the highest summer air temperature in the 80's, winter temperatures dropping to 60 or 70 degrees below zero and an annual rainfall of less than 10 inches. What's more, it was planted in 1914, abandoned in 1924 and still flourishing in 1946.

Seed from the surviving plants was harvested and tested at the Alaskan experiment station. Seed supplies are being increased in Utah, since it is not easy to produce seed under Alaskan conditions in most years.

Canada, too, saw the need for adapted legumes. At the experiment station at Vancouver, British Columbia, Dr. G. G. Moe developed a rambling alfalfa by hybridizing common, blue flowered alfalfa with yellow flowered Siberian types.

When this station was closed due to lack of support, the experimental fields were leased to a commercial dairyman under the condition that the field containing the alfalfa breeding material was not to be plowed. It was intensively grazed, however, and several years later when the station reopened, Dr. Moe selected the most promising plants from those which withstood the heavy grazing and the neglect of an interrupted breeding program. These were combined into the variety now known as "Rhizoma."

At present, Dr. D. H. Heinricks of the Dominion experimental station at Swift Current, Saskatchewan, is also conducting an intensive research program on rhizomatous alfalfa. His blue flowered clones in a single year spread out as much as two to four feet, while yellow flowered strains spread only about one foot in the same year.

Alaska and Canada are not the only northern areas which produce alfalfas. Some European varieties are being grown as far north as Tromso, Norway. Bordering the deeply worn tourist paths at the old Vasa Castle in Uppsala, Sweden, is a bluegrass sod containing darker green patches of rhizomatous alfalfa. These plants have a spread of two to three feet.

In 1931, creeping alfalfas of unknown origin were found on a golf course near Des Moines, Iowa. These plants, along with the grasses on the course, had been mowed closely several hundred times during the five years immediately preceding discovery. In spite of this, the plants were still vigorous and spreading. The most promising plants were transferred to the Nebraska collection.

Nebraska workers have combined several selected lines to form synthetic varieties. Of the several synthetics produced, A-

224 seems to measure up most nearly to what might be desired in a rhizomatous, creeping alfalfa.

The next 10 years will bring a more intensive program of survey, breeding and evaluation of grazing type alfalfas for the semi-arid west and the cold northern regions. There is still much to be learned about their adaptation, establishment, growth habits and management.

A comparative, grazing alfalfa nursery has been started with most of its plots located in the Great Plains area. Varieties now in commercial production are being tested. New strains will be evaluated as rapidly as seed and facilities are made available.

Much time has passed, but still more time is required before legumes can be established in all the grasslands that need them. It now seems likely the most promising plants for the dryland west will be found in the form of creeping, drouth resistant alfalfas, specially suited for grazing use.

Farm Hands Never Had It So Good

Farm wages may look small beside city shop pay, but, when a full time hired man on a modern up-and-going farm counts his "extras" and year long security, the farm hand has a good deal.

The city worker has to earn $1.87 per hour, 40 hours per week, 50 weeks a year, to equal a full time farm hired man at $200 per month, figures L. H. Brown, Michigan agricultural economist. This compares a farm hired man getting a free house and a gallon of milk a day with a nonfarm worker who lives 10 miles from his job. Farm wages of $150 per month would equal $1.50 per hour in town on the same basis.

The farm hand works longer hours, possibly an average of 10 hours a day, or as much as 55 or 60 hours per week. But the factory worker does not get paid for the time he spends driving to and from work.

The factory worker has unemployment compensation—a subsistence wage for limited periods of unemployment—but the farm worker is seldom out of work. Both workers are under social security old age benefits. Paid vacations for most farm workers are about the same as for nonfarm labor, and there are no forced vacations from strikes or work stoppages, the MSC farm economist explains.

Farm work is out-of-doors, varied from day to day and the hired man can set his own pace, with less close supervision. The farm employee has closer personal relations to his employer.

—*Michigan State College*

Lincoln: What He Did for Agriculture

Condensed From Kansas Farmer

James Senter Brazelton

LINCOLN was not a farmer and never claimed to be one. Of the many speeches delivered by Mr. Lincoln during his political career, in only one did he touch upon agriculture. Yet his contribution to agriculture was great.

He was born of poor parents on a farm near Hodgenville, Kentucky, and in his youth acquired much farm experience working for his father and as a hired hand for neighbors. When he was 21 he helped his father establish a farm in Illinois, then started out in the world for himself. He earned his living hauling rails, manning flatboats and choring. During this period of his life he came to be known as "Honest Abe."

This close-hand experience at farming did not make of Lincoln a progressive or outstanding farmer like George Washington. However, the intimate contacts with the struggling farmers of his day taught him the significance of farming. They prepared his mind so that years later, he did not hesitate to do something of very great benefit for farmers of this nation. Abraham Lincoln will be forever glorified as the emancipator of the slaves. But because of certain things he did as president all farmers should look upon him as their great benefactor.

Frontier farming of Lincoln's day is not to be compared with our modern scientific agriculture. Yet President Lincoln had a great deal to do with the tremendous revolution that has been going on in farming ever since his time.

The system followed in the early days of the nation could not be called agriculture. The pioneer cleared forest or burned prairie. Plowing the land, he kept it in crops as long as it would grow anything. When fertility of this piece was used up the "farmer" would clear another piece and farm it to death. This process was repeated as long as there was any new land left.

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Topeka, Kansas

Lincoln knew about the decreased acre yields of grain and in his only major speech on agriculture delivered in Milwaukee in 1859, he pointed out that it was the chief farm problem of the day and suggested "putting the soil to the top of its capacity." It was the heavy farm support he received as a result of this speech, together with a split in the Democratic party, that elected him president.

Burdened as he was with all the problems of a nation being torn asunder from within, it is surprising President Lincoln had any time to consider problems pertaining to peace. But on May 15, 1862, there came to his office a bill from congress proposing to set up a new government bureau, "the general designs and duties of which shall be to acquire and diffuse among the people of the United States useful information on subjects connected with agriculture." The bill carried with it a provision boosting the annual appropriation up to $118,000. The president had no hesitancy in signing the bill, because he had asked congress for it, and with his signature the United States department of agriculture was born.

Isaac Newton, a Pennsylvanian, became first commissioner of agriculture. A plot of ground, now the beautiful department grounds, was used as an experiment farm. A chemist and an entomologist were appointed to conduct various new research projects.

Just five days after he signed the bill creating the department of agriculture Lincoln signed another bill which had come out of congress labeled the Homestead Act. This act is looked upon as the great turning point in the country's agricultural development, for it opened a gigantic area of 234 million acres of public land which could be had for farming by merely living on it five years. This land consisted of the vast new domains which the United States had bought from foreign countries but which had never been settled.

Stimulated by the Homestead Law agriculture now very definitely passed into the commercial stage when farmers began living upon the profits of farming rather than on the products of the farm itself. There followed such an expansion of agricultural enterprise as the world had never seen. Following the opening of the prairie states came the building of transcontinental railroads. Then came the invention of the twine binder and the steel moldboard plow, and after these came the rapid use of improved agricultural machinery.

A bill known as the Morrill Act, of outstanding importance agriculturally, became a law with President Lincoln's signature on

July 2, 1862. This was the law that made possible setting up Land-grant colleges. The originator of the idea was Justin Morrill who first proposed the plan of giving federal land to the states, allowing them to sell it and so finance a college course in agriculture and mechanics. According to his plan the government would give to the states for this purpose 11 million acres.

When the proposal first came up in congress in 1857 it passed both the house and senate after a bitter fight, but was vetoed by President Buchanan. The southern states had led the fight against it so Buchanan did just what they expected him to do. But when the bill again came up for consideration in 1862 there were no southerners in congress and a new president was in the White House, so the bill easily passed.

But it was not so easy to put the provisions of the bill into practice, for in those days few teachers were qualified to teach agriculture; there were no textbooks on farming. Finding something to teach and someone to teach it was quite a problem. The states were slow to avail themselves of the opportunity to develop agricultural education. In many cases they had a hard time selling the land that had been given to them.

These three bills, which have done so much toward changing the course of the nation's agriculture, were born at a time when the future of that nation seemed dark indeed and all three were sponsored by a man who made no pretense at being a farmer.

Borer Resistant Corn Performs Well

New "borer resistant" hybrid corn varieties developed by the Minnesota agricultural experiment station gave good performances in experimental plots during the past growing season, reported E. L. Pinnell, associate professor of agronomy.

On the basis of visual ratings Minhybrids 411 and 412 showed 30 to 40 per cent less damage from corn borers than other Minhybrids of the same maturity rating. Developed as the result of work by university corn breeders and entomologists, these hybrids are resistant to the larval feeding of the first brood of the corn borer. Seed will not be available to farmers generally until 1954.

— *University of Minnesota*

Improve Your Dairy Herd By

TYPE CLASSIFICATION

Condensed From New Mexico Extension News

E. E. Anderson

Dairy Specialist

ALL five major dairy breed organizations carry on a type classification program. It is aimed at helping herd owners analyze the type of their animals and in so doing develop a more efficient herd improvement program. In accomplishing this end the entire dairy industry benefits.

In order to classify a herd, an official inspector comes to the farm and carefully inspects every eligible animal. Each animal is given an over-all grade or rating. In addition, the various parts of the body are given separate ratings in order that the herd owner might know wherein his animal is especially weak or strong. The ratings given are based on the official score card which is recognized by all the five major dairy breeds.

Anytime during her lifetime, after a cow has once freshened, she is eligible for classification. There is little variation between breeds in classifying males.

Classification differs from the showring in many important particulars. Emphasis in classification is on the functional strengths of the animal. This should be the case in the showring but too often it is partially overlooked. In the classification program the animals are inspected at the owner's farm and in their "working clothes" without benefit of special fitting or preparation. Animals are compared to the ideal, or true type of the breed, and there is no rivalry between animals as in the showring with one placing first, another second, etc. Physical injuries, which are not an inherited factor, such as the loss of a quarter of the udder due to mastitis, are disregarded by the inspector. He bases his judgment on the unblemished counterpart.

The parallel between type classification and production testing is easily seen. Both are intended

Reprinted from New Mexico Extension News
State College, New Mexico

to give official recognition to the merits demonstrated by the cows. But to be official, the inspection or testing must be done by an outsider, someone trained in the exacting details of his work. Many a man whose milk weights are not checked by a tester has said confidently, "I don't need anybody to tell me how much milk my cows give." But after testing the herd he is often surprised to see that certain cows have out produced some of the barn favorites. When the dairyman offers surplus animals for sale he finds those with official records bring better prices than those with unsupported statements of production.

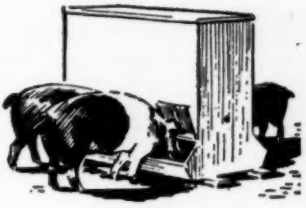
With the official classification for type, the dairyman who boasts, "I know how good my cows are without having an inspector show me" is missing out in two ways. First, the trained inspector, analyzes the good points as well as the less satisfactory ones on each cow, on a herd-wide basis. He is in a position to recommend qualities desirable in the next herd sire, in order to maintain the good points while attempting to correct the weak ones. Secondly, herd classification has a definite advertising value, and is helpful in attracting prospective buyers, especially through mail transactions with distant purchasers. In buying a herd sire or other animals from a classified herd, it gives the purchaser a picture that could be had in no other way except by actually seeing the animals involved. It means animals can be bought and sold on official grades which are the same in Maine, Oregon or New Mexico.

Type classification is one of the very important tools that aid a dairyman in doing a more thorough job of breeding, or herd building. The type standard set up for classification is sound because it emphasizes those basic requirements that conform to qualities associated with a long lifetime of profitable production. To possess these desirable qualities and score high in type classification, a cow must have a rugged constitution, ample feed capacity, strong feet and legs, and a capacious and soundly attached udder.

The first essential for success in dairying is reasonably high producers. The second essential is that a cow maintain high production over a long lifetime. A cow must have whatever type or qualities of body conformation are necessary to stand up under heavy production year after year. That's where type classification fits into the picture.

Each dollar that you miss in legal deductions at income tax time costs you about 22 cents, says a University of Illinois farm management specialist.

15 Years of Sow Testing



Picking gilts on the records of their parents gives fast gaining porkers.

Condensed From The Farmer

Omar Shonkwiler

TESTING the ability of sows to produce profit making litters is taking a place alongside dairy herd improvement, poultry record of performance, and beef bull progeny testing as a sorting method for farm livestock.

Since 1938, more than 100,000 "sow tested" hogs have gone to market through the Austin (Minnesota) Swine Improvement Association. This is the story of records made by those hogs and of how some farmers in the association use sow testing as a practical farm tool.

As operated by the association, sow testing sets a production standard for picking breeding stock. Sows and gilts and their litters are earmarked to make record keeping possible. Pigs are weighed at 56 days. Then, to see how rate of growth relates to carcass quality some litter mates are sold on a carcass grade and yield basis.

Because litter weight at 56 days is a measure of rate of gain which carries through the pig's life, this weight is used as the association's standard of eligibility for its annual production tested boar sale. To qualify for the 1938 sale, boars had to come from litters which weighed a total of 250 pounds at 56 days. This standard has been revised so that now a gilt's litter must weigh 225 pounds, and a sow's litter 280 pounds.

The official 56 day litter weights are taken by someone other than the owner. P. J. Holland, Austin high school agriculture instructor who started the program, veterinarians, and veterans' agriculture teachers have acted as official weighers. To check carcass quality of tested hogs, the Hormel Company of

Reprinted by permission from The Farmer
St. Paul, Minnesota

Austin co-operates by buying hogs on a carcass grade and yield plan.

Since 1938, 110,141 hogs have been earmarked and weighed at 56 days. The first year, average 56 day litter weights of 53 co-operators was 110 pounds. Last year 56 day litter weights of 141 co-operators averaged 240 pounds —better than a 100 per cent increase.

In 1938 the average individual pig weighed 30 pounds at 56 days. Last year the average was 35 pounds. About four pounds of that five pounds gain were made before antibiotics and vitamin B-12 became generally available as growth boosters.

In the 15 years, 960 lots of hogs were checked for carcass quality—that is grade and yield of lean pork cuts. Nine out of ten farmers who sold hogs under this plan received premiums above the going market price for their hogs. The average premium paid was 31 cents per hundred pounds. Some farmers received as high as 75 cents premium per hundred pounds.

But the most striking facts coming out of the carcass yield records are these: *The hogs that grew to market weight the fastest also yielded the highest percentage of lean meat premium cuts.* After weighing pigs at various ages, association officials found the pigs heaviest at 56 days carried that fast growing ability through to market weight. This means that the farmer who earmarks gilts or sows and litters and weighs the pigs at 56 days can build a herd of fast growing hogs that will turn corn into the most desirable kind of market pork.

On a farm, sow testing, in selecting purebred or market hog breeding stock, takes over where the eye leaves off. Membership in the Austin association includes both farmers who raise purebreds for sale as breeding stock and farmers who raise cross-breds for market. Each farmer sets his own standard for gilts to be kept as breeding stock. While the association considers only weight of the litter, farmers also set a goal for number of pigs per litter.

Sow testing helped Wayne Hotson's herd of Chester Whites take three association records last year. Hotson had the highest average litter weight, the heaviest purebred litter at 56 days, and the heaviest single pig at 56 days. His record litter of 12 purebreds weighed 812 pounds at 56 days. The average weight of seven litters was 613 pounds. The record single pig, one of a litter of four boars, weighed 102 pounds at 56 days.

Hotson has had production tested sows and gilts ever since the association began operating. His 15 year litter size average is 7.7 pigs.

Sow testing is also a regular

practice in Myron Aultfather's herd of purebred Poland Chinas. Myron and his father, J. H. Aultfather, have one of the oldest Poland China herds in the state. Since they started sow testing they have discarded first year gilts which farrowed less than seven pigs. Last spring only four out of 23 sows and gilts farrowed less than seven pigs.

The Aultfathers market one-half to two-thirds of their spring pig crop, more of the fall crop. Their Poland Chinas sold on the carcass grade and yield plan bear out association records that fast growing pigs have a higher percentage of lean cuts. Out of 71 pigs sold under the grade plan last year, there was only one that didn't rate a premium over market price.

Of course, the other half of herd improvement must come from the boar's side of the family. Purebred breeders who production test sows and gilts buy tested boars whenever possible. But they point out that "you can't keep buying boars too close to home."

Buying boars too close to home doesn't worry the producer of market hogs, especially if he cross-breeds. This fact makes sow testing a more valuable tool for the cross-bred market hog producer than for the purebred breeder. The cross-breeder can buy a tested boar every time he changes breeds. This enables him to control production factors in both sides of the cross-bred pigs.

Cory Hanson was one of the original group of commercial men in the association's first year of operation. He crosses Poland Chinas, spotted Poland Chinas, and Durocs, using production tested boars.

He believes that with production tested boars he can, somewhat, modify the sow testing end of the business. He marks all litters of seven or more pigs. Breeding gilts are saved from these litters if they measure up to his eye and if the litter does well. Doing well, in Hanson's judgment means that given good feed, pigs should weigh 225 pounds in six months.

Hanson's only objection to a complete sow testing schedule for the commercial hogman is that weighing every pig at 56 days takes about a day during the busy time of the year.

Nathan Goodwin, another cross-bred market hog grower, gave labor shortage as his one objection to sow testing. The Goodwin cross-bred herd was production tested for 10 years. During that time 56 day litter weights went from 280 to 350 pounds. Sows and gilts gained an average of three-fourths to one pig per litter. Hogs sold on the carcass grade and yield plan averaged $1 per head above market price.

Some commercial hog producers find time to apply the

complete sow testing program. Howard Butler, winner of the association's commercial production trophy for 1951 has followed the complete program for five years. He buys production tested boars, discards gilts which farrow less than eight pigs. His litter average last spring was 8.5 pigs per litter from 15 farrowings. The pigs grew to 210 pounds in five months.

For purebred breeders and market hog men alike, sow testing measures a quality that the eye cannot see. You can tell by looking whether a gilt is of good type, has a clean, open face, good underline, and other desirable conformation. Sow testing tells you what to expect from that gilt in the way of pounds of pork she will produce.

Barn Cleaner Cuts Hard Work on Dairy Farm

How do you clean your dairy barn? You may be able to cut cleaning time in half and make the work a lot easier. Recent time studies at the University of Wisconsin electric research farm show that cleaning time may even be cut to one-fifth with a completely automatic set-up. Farm engineers L. A. Brooks and F. W. Duffee kept records of the time needed to clean and scrape gutters on farms using different methods of cleaning.

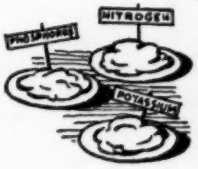
On two farms where the manure was loaded into a wheelbarrow, it took almost 70 seconds each day for each cow. On a farm where a litter carrier was used, cleaning took 56 seconds a day per cow. With two men loading a spreader that was pulled down the center alley, the average daily cleaning time for four farms was 55 seconds.

A semi-automatic barn cleaner now looks practical for a small dairy herd, the men say. The semi-automatic cleaner is merely a scoop that pulls manure along the gutter and elevates it from the end of the gutter into a spreader. On two farms using these semi-automatic cleaners, the average cleaning time was only 28 seconds for each cow daily. In addition, the work was easier. Instead of lifting manure, the farmer spent most of his time walking and guiding the scoop.

An automatic, more expensive, barn cleaner is better for farmers with large herds. On two farms equipped with these cleaners, the average cleaning time was 13 seconds per cow each day. With these automatic cleaners, the only work a farmer has to do is scrape the center alleys and stalls. — *Wisconsin Extension*

Illinois Central Railroad Helps Farmers With a

Soil Test 'Lab' on Wheels



Farmers Along the Line Won't Plant Without an IC Soil Test

Condensed From Illinois Central Magazine

FARMERS down Mississippi-way are saying: "No sense in a man plowing and planting in the dark any more."

And it's true. The Illinois Central's new mobile soil testing laboratory now makes it convenient for Mississippi farmers to eliminate guesswork about what kind of crops will grow best in the soil on their farms.

Agricultural agent George Lirely of the railroad's agricultural office at Jackson, Mississippi, and the railroad's rolling laboratory, go about testing soils practically at the farmer's doorstep.

Analyzing the soils from each of a farmer's several fields, Mr. Lirely can recommend what field will be best for what crop. He might say, for example, after a careful scrutiny of the test results, "Corn should do well on this field, pasture is a good bet on this one, and you'd do best to leave this one in timber."

The laboratory which Mr. Lirely uses in this work, and which is intended for use in the future by other agricultural agents of the Illinois Central at other points along the line, is a streamlined trailer which connects to the rear bumper of the agent's car, and is thus hauled easily from one country town or farm to another. The rolling laboratory was built this year, and made its trial run May 6 in Pike County, Mississippi.

When the Illinois Central agricultural agent arrives with his car and trailer at the site of operation, which may be a farmer's yard or a roofed over livestock arena, he picks out a level spot, with clearance on both sides of the trailer, and parks.

To get the laboratory ready for business, he draws down the soil testing racks on each side of the trailer. These two racks contain boards which hold soil testing glass vials, funnels lined with filter paper, eye droppers used for measuring chemicals, tiny spoons for measuring soil samples, and a tin rod for stirring mixtures and

Reprinted by permission from Illinois Central Magazine
Chicago, Illinois

causing precipitates. It is by these precipitates that the character of the soil is judged.

The agricultural agent also sets up boards on which soil grinding will be done and records of tests written out. Bowls and sieves for grinding are set out on the boards. These boards may be fastened to the bumper of the trailer or between the rails of a handy fence. Everything is simple and efficient. The idea is to test the soil samples quickly and accurately, without interference from fancy trimmings.

Operation of the soil tester is not a one man show. The Illinois Central agricultural agent usually asks two or three of the farmers who have come in to get their soil tested to give him a hand. They help grind soil and test it under his direction. Sometimes, as at a recent analysis job done in Tylertown, Mississippi, he gets help from local soil experts.

The soil test itself is simple—for the man who knows how to do it and interpret it.

The readings are entered on a field report, which is retained by the Illinois Central laboratory. Then the information is transferred to a soil test report, which is given to the farmer and shows him the analysis of his soil as to lime, phosphate and potash content. It is on this sheet that recommendations are made by the agricultural agent. The agent also bases his suggestions on a report furnished by the farmer which tells the past cropping and fertilizing history of the land, whether land is hilly or bottom land, what particular problem the farmer may have with this particular acreage, such as drainage, and what crop he would prefer to grow on the land the coming season.

With his soil analysis record in hand, the farmer can intelligently plan his planting for abundant production at a satisfying profit.

Although there is at present only one trailer of this type in operation on the railroad, soil testing is a system-wide business of the Illinois Central agricultural agents on all lines, western, northern and southern. These agents have been making more than 15,000 soil tests a year, using office laboratories or portable testing apparatus carried in the trunks of their cars. They were the first to take soil testing into the south a quarter century ago.

Forty years ago, it took 35 man-hours to produce an acre of corn yielding 26 bushels (United States average); in recent years (1949-'51) it took only 17 man-hours per acre and the yield was 38 bushels. To produce 100 bushels of corn 40 years ago, took 135 man-hours; in recent years only 45 man-hours were required.

Your Lease Sets the Pattern

Iowa survey shows advantages and problems associated with cash and share leases.

Condensed From Iowa Farm Science

Earl W. Kehrberg and Earl O. Heady

EACH year thousands of farm leases are signed. In Iowa, over 50 per cent of nearly 35 million acres of farm land is rented. Of the rented farms, about 54 per cent are operated under crop-share leases, 16 per cent under cash leases, and 24 per cent under livestock - share leases.

To some degree, every lease signed sets the pattern of farming operations for the farm involved. And with leases covering over half of the farm land, the combined effect of these leases is important —both to each individual farm concerned, and to the state's agriculture as a whole.

The facts presented in this article are based on a survey made in Tama and Benton counties in 1949. But the problems pointed up in these two counties may be similar to those in other areas.

Crop-Share Rents

Tenants typically paid half of their corn as share rent. Very few paid less, and none paid more. But share provisions were not nearly as uniform for other crops. About 75 per cent of the tenants gave their landlord two-fifths of their oats, while the rest gave half. Sharing arrangements for soybeans were fairly evenly divided between giving two-fifths and half for rent. For hay and pasture land, crop-share renters generally paid a cash rent averaging about $7 per acre.

Sometimes differences in shares of oats and soybeans were used to compensate the landlord for a low return on other services he had furnished. For example, a good set of buildings might be used as a reason for giving the landlord an extra share of the soybeans.

Approximately half of the

Reprinted from Iowa Farm Science
Ames, Iowa

leases called for sharing seed corn expenses; about a fourth for sharing of oat and soybean seed expenses. Less than half of the leases stipulated the sharing of fertilizer expenses. Grass and legume seed were mainly a responsibility of the landlord. Only a few of the leases provided for sharing corn and hay harvesting costs.

How expenses are shared often determines what investments will or will not be made on a particular farm.

Cash Rents

Average straight cash rent paid in the area was $10.29 per acre. Tenants related to their landlords paid slightly less. Nearly half of the cash-lease landlords shared seed expenses, very few fertilizer expenses.

Buildings were treated mostly as a landlord service, although a third of the cash tenants reported they paid some maintenance costs — especially where the tenants were related to the landlords.

When tenants and landlords were related, both cash and share leases were often modified. In many cases the leases were oral.

Length of Lease

A farm tenant who may have to move or thinks he may have to move after one year on a farm often doesn't feel justified in trying to make long-run decisions. More than 70 per cent of both cash and crop-share leases were for one year only. Less than 13 per cent were for more than three years.

However, since tenants might not always worry about leaving the farm just because the legal term of their lease was short, we asked tenants for their opinion on the matter. About 15 per cent of the cash and 24 per cent of the crop-share tenants said they were uncertain that their stay on the farm would be more than two years. But 50 per cent thought they could stay six years if they chose.

Which Lease?

It seems likely that cash tenants as a whole have selected their lease type because of relatively stronger capital positions—allowing them to assume more risks. Beginning farmers with limited funds often choose a crop-share or other share type lease rather than a cash lease if they have a choice.

Cash leases are looked upon as involving too much risk for the operator short on capital or inexperienced in farming operations. Thus the share lease is chosen to avoid some of the risks.

Size of Farm

Both share and cash tenants believed that because of the risk involved in making fixed per acre rental payments under cash rent, the size of the farm should be smaller under cash leases. And cash tenants did rent somewhat

smaller farms. The 1950 census figures show that cash leased farms average near 150 acres and share-leased farms near 200 acres.

Share tenants estimated the share rent on their farms amounted to about $20 per acre. Cash tenants estimated their farms returned an average of near $19 to the landlord. But both groups indicated that, under cash rent, about all they'd be willing to pay was around $12 per acre. Greater risk associated with the cash lease is believed to have caused the difference. (At the time of this study, farmers were expecting a business slump. Price levels and expectations have risen instead. Cash rents also have gone up but still lag behind share rents in this area.)

Cash and share tenants both indicated a preference for a 220 acre farm under cash leases. But if they had to pay a cash rent equivalent to share rent, they wanted only 110 acres.

Again, greater risk was associated with cash renting. The payment is fixed regardless of production; the more land rented, the greater the fixed payment and the possibility of larger losses. Tenants did indicate a preference for larger farms under cash rental rates at the time of the study.

Differences

We found little difference between share and cash leased farms for practices from which the returns are realized within one year. Perhaps returns were greater than costs in most instances—even when the share tenant paid the entire cost and received only part of the production. Items such as fertilizer were applied at some recommended rate or not at all.

Under share leases it's possible to make such practices more profitable for the tenant by sharing costs in proportion to the sharing of production. On share-leased farms where fertilizer costs were not shared, less than 10 per cent of the tenants fertilized corn. Where costs were shared, 60 per cent of the tenants fertilized their corn.

Cash tenants tended to raise proportionally less grain and more forage than did crop-share tenants. This may have been the result of more livestock on the cash rented farms reflecting the stronger capital position of the cash renters.

Which Preferred?

Only six per cent of the tenants operating under cash leases would prefer a share arrangement, while near 45 per cent of the share tenants would prefer a cash lease. Over half of the cash tenants and a third of the crop-share tenants thought cash leases aided more efficient farming. And most farmers believed that the going cash rental rates allowed the tenant greater profits.

Nearly half of the tenant operators said they'd operate their farms differently if they were the owners. Cash and share renters were alike in this respect except where the tenants were related to their landlords. These tenants were more often satisfied with the situation as it was.

If They Owned . . .

Changes were suggested more often in the cropping system than in the livestock system. Tenants already have full control of their livestock under these lease types. Both share and cash tenants emphasized that buildings should be added or repaired if farming were to be carried on most efficiently.

Share renters were more interested in changing their rotation and pasture acreages than cash renters. None of the cash tenants thought they were raising too much corn, but about five per cent of the crop-share tenants preferred less. More share renters wanted to increase their cattle and hog enterprises than did cash renters.

Unfit Grain Brings Fines to Shippers

Shippers of contaminated grain can expect losses, criminal charges and fines, says L. E. Folsom, Ohio State university. Food and Drug Administration has seized carloads of grain contaminated by insects, rodents or birds. Such grain is declared unfit for human food. Country grain dealers now are required by the administration to guarantee that grain they ship is not adulterated. This shifts responsibility from buyer to shipper.

Hens Have Hen Parties

Hens also have "hen parties," it seems. A Kansas State college professor, A. M. Guhl, reports that when the appearance of a hen's headdress—the comb or feathers—is changed, her position in barnyard society also changes. Guhl took several hens and altered their appearance in various ways—by adding feathers, or plucking them, or by enlarging the comb with red felt cloth. He found that when these hens were put back with the flock, the other hens took one look and immediately attacked them.

As a result of the battle, Guhl reported, the "pecking order" of the "re-styled" hen changed—sometimes up, sometimes down. Previous studies by Guhl have shown that chickens have a "peck order" that goes from the top bird, which pecks all others and is pecked by none, to the low bird, which is pecked by all and pecks none.

—*Farm and Ranch News*

Farm Drainage Problems

Study your drainage project carefully. It can be a valuable asset, or costly liability.

Condensed From The Rural New Yorker

James E. Lawrence

BECAUSE too much water can be as detrimental as too little, adequate drainage of useful lands is an essential part of successful agriculture. Good drainage makes possible a farm management program that conserves and improves the soil and makes use of the excess water that falls on the farm. And, as a sound investment, it often pays farmers substantial dividends in the form of increased yields and better land utilization.

Walter Huber of Amenia, New York, found this out recently when he decided to do something about a 37 acre piece of native pasture on the flats of the meandering Webatuck Creek, which flows through his farm. For years the flats had been kept in native grasses which afforded little pasturage for the Huber dairy herd. However, it was always realized that the creek bottomland had some productive possibilities, although complicated by the fact that the unstable Webatuck is subject to frequent flooding. Moreover, this flooding had caused many pockets and irregularities to develop and had changed the land into a meadow. As a result, much of the area was covered with water tolerant, unpalatable native grasses.

Huber's approach to the problem was to first select a grass tolerant to frequent water submersion, yet palatable to cattle. For this he chose reed canary grass and ladino clover. He seeded this mixture to half the area the first year and the remainder the following year. The year after the first seeding he pastured the new area and got excellent results from it.

In the meantime, Huber had been thinking about the problem of actual water removal and had boiled it down to its simplest form. He had to find an effective and inexpensive way to obtain a maximum of drainage to carry off as quickly as possible the water from the Webatuck's frequent

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333 West 30th Street, New York City

flooding. He did this by constructing a long, single broad based ditch which empties into the river at a far corner of the pasture. The ditch is so constructed that it connects most of the lowest spots in the field in addition to picking up excessive runoff from an adjoining hill.

The results have proved quite profitable for Huber. His second seeding was even better than the first, and the combined increased acreage of high quality grasses now provides him with both grass and silage as well as plenty of good pasture. With flooding damage cut to a minimum, the once poor meadow has jumped high in production and has become a valuable part of the farmstead.

Here in the northeast drainage problems fall roughly into three categories. The first type involves the complete drainage of sizable areas too wet to work or to use for pasture, such as marshes, swales and swamps. The second type has to do with partial drainage problems, such as the removal of surplus runoff from the farmstead by the drainage of sags in level fields or wet hillsides. The third type is concerned with remodeling out-dated drainage systems for better service by incorporating improvements in existing ones or by rebuilding the entire system.

Since all types of drainage problems are often complex to a degree, due to special considerations on individual farms, it is important to study and understand thoroughly all sides of the problem for effective and lasting results. Solutions to drainage problems that are apparently simple to master are many times costly ventures that fail to give expected results or achieve long-range objectives.

For this reason some type of technical assistance is often necessary when a particularly troublesome drainage problem is involved. This is especially true in cases of complete drainage projects where much money is to be expended. Such situations invariably demand a soil inventory to determine the feasibility of the project from the cost and water disposal standpoint. The same is true for partial drainage problems, since it is important that the drainage system be properly designed for safe and adequate service.

When James Traver, who farms near Pleasant Valley, New York, wished to expand the size of his dairy herd a few years back, he realized it would be necessary to clear more land for pasture. As he saw it, his best bet was a 25 acre piece of brushy marshland close enough to the farm buildings to be easily accessible to the herd. This called for a drainage undertaking. Although Traver did not intend to do the complete

clearing job all at once, he first had to figure some way to drain at least a portion of the land so he could effectively clear the brush and later move in machinery to work up a good sod. In fact, he decided that, while he was at it, he would do something to reduce the erosion to his nearby hilly hay and grain fields which were also poorly drained.

He found that on close inspection he could successfully undertake a part of the clearing job in the fall when several acres of the marsh were relatively dry. Still he was well aware of the fact that a drainage structure would be needed before a good grass sod could be developed. So, after clearing a portion of the marshy area, he decided that a simple diversion ditch would answer his purpose. He then contructed the ditch to skirt the wet hillsides to reduce erosion, had it cross and drain the new land, and finally empty into the head of the marsh. From this point, the water was safely carried away from the farm through a large highway culvert.

Before continuing to clear the wetter portions of the marsh, Traver had a check made of the soil to determine its capabilities. He figured that he had already salvaged the best part of the wet land, but he wanted to be sure. The results of his soil survey showed that the land had a very low capability rating from which only pasture of the poorest quality could be expected. Moreover, the high cost involved in completely draining the marsh overshadowed the land's potential value.

In view of this, Traver consulted technicians of the New York state conservation department and signed up his marsh under a wildlife program for ducks and muskrats. A dam, equipped with a water control structure, was then built across the marsh to stabilize and manipulate water levels for increased wildlife production. As it developed, the solution to at least a portion of this farmer's drainage problems was actually through keeping part of the land underwater. Instead of investing a large sum in costly drainage which guaranteed only poor returns, he can now realize a good fur return on a piece of land which formerly provided no income.

Complete drainage offers definite advantages where conditions are right. Fertile soils are often tapped which are rich in humus and other organic deposits. It also adds additional tillable acreage to the farmstead by bringing more land into production.

In addition to diversions, methods of drainage used in the northeast for partial drainage problems include tile drains, open ditches, sod waterways, and, to an extent, terraces and beddings. Generally the simplest and probably the

least expensive way to dispose of excess runoff is to have the waterway follow courses of natural drainage. A close inspection of the farm will soon reveal these natural waterways. When properly utilized, these waterways normally require less expense for grading and installation of drainage structures than artificial waterways.

Another important consideration is a safe and suitable outlet for the over-all drainage from the farmstead. If a good outlet or outlets cannot be found or developed cheaply, the usual practice is to allow the water to spread out over a large area.

Often runoff from the farm is made to discharge into drainage ditches along a public road. In these cases, it is sometimes customary for the landowner to make a co-operative agreement with the road officials to maintain these ditches both for draining the farm and the road. Usually the farmer furnishes part of the land needed for the waterway, helps construct the ditches, and provides for the initial upkeep of the system, such as furnishing seed and mulch for planting against erosion. The road officials then usually agree to maintain the system by keeping it free from debris and making needed repairs.

Agreements on drainage systems are also usually necessary with neighboring landowners where the system crosses their lands or where outlets are on their properties. Easements or permits are usually readily granted, since adequate water disposal over wide areas is seldom limited to property lines. Such permits, filed with the county clerk, allow for the creation and maintenance of continuous waterways and outlets. These permits guarantee that the system will be allowed to function despite a change of ownership.

Another important point is that state and local laws which pertain to drainage, water diversion and related matters should be carefully studied and taken up with the state and local authorities when the drainage system is planned. This is particularly essential in cases where the natural course of the water is affected or changed.

In the final analysis, it is well to weigh heavily all the many complexities that are bound to arise when drainage is considered. Drainage can often be a valuable asset or, if not carefully studied in advance, a costly liability.

Investment per person engaged in agriculture is higher than for the person employed in industry and a farmer operates more mechanical horsepower in his average farming operations than the city dweller does at his job.

Minnesota - Mississippi 4-H Club Exchange

States at Both Ends of the Big River Trade Boys and Girls to Bring Better Understanding

Condensed From The Kraftsman

Jo Nelson

A BETTER understanding and close ties of friendship have come as a result of a 4-H club exchange program among young people of two widely separated states. The two states are Minnesota, where the Mississippi river has its source in a tiny stream, and Mississippi, several thousand miles of Old Man River to the south.

The idea for the exchange project originated with 4-H club leaders R. O. Monosmith of Mississippi and Leonard Harkness of Minnesota, who decided that young people should have a better understanding of each other's problems, socially and agriculturally. The best way to learn about farming methods and the way of life in another section of the country, they felt, would be to visit each other's states and live and work with 4-H members. As a result, the 4-H Minnesota-Mississippi 4-H exchange program was born, sponsored by the Minnesota and Mississippi extension services.

The heart of the program is the actual living and working with 4-H members from the other state. Last year (1951) 26 4-H members from Mississippi traveled to Minnesota to see what farm life is like in the north. They spent over a week living on Minnesota farms, both working and observing. They saw typical Minnesota farming conditions and some of the 10,000 famous Minnesota lakes.

They went away with varied impressions. Some of them noticed particularly the large dairy barns, protected from the north wind by rows of trees; others were impressed with the farm machinery. Still others were appalled by the huge mosquitoes. But all liked the food and the custom of being

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500 Peshtigo Court, Chicago 90, Illinois

served as many as six meals a day. And everyone found Minnesotans friendly.

One of the highlights of the sightseeing activities planned for them was the trip to Itasca Park where they saw the headwaters of the Mississippi river and took part in an impressive friendship ceremony.

Many of the Mississippi boys and girls who had gone to Minnesota played host this past summer (1952) to the Minnesota delegation of 27 who went south in June. They gave the northerners lessons in chopping cotton, cultivating okra and spraying to control the boll weevil.

Living in farm homes in 15 different counties from the northern edge of Mississippi to the Gulf, the Minnesota young folks had a chance to observe a wide range of farming conditions. They saw tung orchards, pecan groves, fields of cotton, rice and sugar cane, all new to them. They took part in the State 4-H Club Congress at Mississippi State college, visited the newly opened 4-H Training Center on Sarddis lake and another at Ocean Springs on the Gulf. They had sightseeing trips to Civil War battle grounds at Vicksburg, a tour of New Orleans, and saw some of the famous old homes in Natchez. They were introduced to southern hospitality in the form of catfish fries and watermelon cuttings. Most of them tasted southern fried chicken and hush puppies for the first time.

Expecting to find cotton the only crop in Mississippi, many Minnesota 4-H'ers were amazed to learn that dairying is becoming increasingly important in Mississippi and were impressed with the advantage Mississippi farmers have in being able to graze cattle for 12 months of the year. They went back to their home state with glowing reports of southern hospitality and friendliness and with a new appreciation of the problems of their southern hosts.

Now that the two way exchange has been completed, both Mississippi and Minnesota 4-H club members speak of the interstate program as their most significant activity. It has been an adventure in human relations and understanding to carry over into adult life.

For maintenance of stand, yield of hay and production of protein, a good time to cut alfalfa is in early bloom stage when new shoots are started around the base of the plants, but are not high enough to be cut with the mower, says Charles C. Ellwood, University of Arizona agronomist.

Mathematics of a Managed Pasture

Condensed From Soil Conservation

Tom J. Davis

HUGH STANDLEY saved more than $4,000 on cattle feed by properly establishing and managing 32 acres of tall fescue grass.

Using the facilities of the Okfuskee (Oklahoma) soil conservation district, Standley is applying a co-ordinated conservation program to his farm southwest of Okemah. As part of the program, he planted 300 pounds of tall fescue and eight pounds of Ladino clover seed on 32 acres of fertile North Canadian river bottom land. That was in the fall of 1950. Ordinarily the recommended planting rate is 10 to 15 pounds of fescue and one to two pounds of Ladino seed per acre. He prepared the seedbed well.

Sixty rainless days followed, and most of the fescue didn't come up until the following spring. Standley withheld grazing that spring to produce a seed crop and assure fast growth of the fescue in the fall.

In October, 1951, Standley turned 127 two year old heifers and steers into the 32 acres and kept them there until April. They were not allowed to graze the pasture around the clock. They were put in about 1 o'clock each afternoon and taken out around 4 or 5. They were kept out altogether when the pasture was wet or icy.

This sort of management let the cattle get a good fill of high protein forage without walking around enough to damage the growth. The fescue was never eaten below three or four inches in height. That's the secret of good growth.

Standley believes that if he had allowed the cattle to stay on the pasture 24 hours a day, they would have damaged the fescue and clover beyond recovery.

When not on the fescue, the

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animals were kept in an adjoining pasture and fed 15 bales of Johnson grass - lespedeza hay a day. The fescue pasture saved 15 bales of hay daily. Not a pound of cake or other supplement was fed, as the fescue pasture supplied enough protein.

Standley says that without the fescue he would have had to feed two pounds of cake per head daily. By having and properly managing the winter pasture he saved 82½ tons of hay valued at $2,475 and 21 tons of cake valued at $1,932. This was a total saving of $4,407 during the 1951-'52 winter.

Cost of seeding the pasture was $225 for the fescue seed, $13.20 for the clover seed, and $230 for 10 tons of rock phosphate, less $120 PMA payment, or $110. This made his total cost, exclusive of seedbed preparation, $348.20. The net saving credited to the fescue therefore amounted to $4,058.80.

Standley took the cattle off fescue April 1, 1952, to get another seed crop. Otherwise, grazing could have continued two months longer. He harvested 5,000 pounds of clean fescue seed in June.

"I plan to plant 100 additional acres of fescue to help balance my year round grazing scheme," Standley says. "Hereafter I'm going to use 100 pounds of ammonium nitrate per acre as top dressing each spring and fall, as this gives a good supply of nitrogen for plant growth and seed production.

"When I can save better than $4,000 on a feed bill while wintering my cattle in good condition, harvest 5,000 pounds of seed and still have my pasture, fescue has a definite place in my conservation program."

Antibiotics Save Hog Feed Costs

Feeding tests conducted at Iowa State college show that antibiotics in swine rations result in feed savings of up to $2.28 per hundred pounds gain. One lot of pigs was fed for eight weeks on corn and trinity mixture (25 pounds of alfalfa meal, 25 pounds of linseed oil meal, and 50 pounds of tankage or meat scraps). These pigs took 319 pounds of feed per hundred pounds and cost $12.12 per hundred pounds gain. They averaged 102 pounds after eight weeks on feed. A second lot, fed a ration consisting of corn meal, soybean meal, minerals, and fortified with B vitamins and antibiotics, averaged 118 pounds after eight weeks. They ate only 257 pounds of feed per 100 pounds gain—at a cost of $9.64 per hundred pounds. All the feed costs were calculated on the basis of 1952 feed prices.

How to Combat
Prussic Acid Poisoning
in Sheep and Cattle

Condensed From Sheep Breeder

A. A. Case, D.V.M.

SHEEP and cattle raisers should know that an assortment of plants, not usually considered poisonous, may be exceedingly dangerous under certain circumstances or conditions. There are several cyanogenic plants. Among them are Sudan grass, Atlas Sorgo (and other canes), Johnson grass, wild cherry, choke cherry (all of the common "stone fruits"), arrow grass, and in some instances, apparently, such plants as the common elder berry. The leaves are the most poisonous part and are the most likely to be eaten by sheep and cattle. Any of the above mentioned groups of plants may prove to be poisonous if eaten in other than very small amounts. Sheep have been killed by as little as two ounces of leaves, but a much larger amount can often be consumed with safety.

Several of the above named groups of plants are commercially raised while others are common as native herbs, shrubs or trees. The poisonous principle is produced by the breakdown in the animal's stomach of a substance known as a glucoside, which is a combination of sugars with HCN or hydrocyanic acid (commonly called Prussic Acid). The HCN is a deadly poison. The glucoside is usually present in small amounts in many of the above plants but under certain, usually unfavorable growing conditions, it builds up to much larger amounts and then causes trouble if the plant is eaten by sheep or cattle. Often the plant is eaten and then a drink of water "touches off" the poison. As mentioned above, the amount of the poisonous principle varies from just traces to as much as 0.2 per cent in certain of the cyanogenic plants. One thing in common with all the cyanogenic plants is the tendency for the greatest amount of the HCN to be present during some adverse condition such as wilted, frosted or

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Chicago, Illinois

bruised foliage.

One instance of poisoning of sheep and cattle happened where a large wild cherry tree was broken over in a wind storm and the cattle and sheep grazed of the leaves the following day as the leaves were wilting; a number of animals died. In another instance animals died following the eating of choke cherry leaves from pruned branches tossed into a pasture. Peaches and plums have also been the cause of losses, usually in orchards following a sharp frost which drops the leaves in large numbers where animals can eat fairly large amounts in a short time. Sometimes, a small handful of wilted cherry leaves will kill a hungry sheep in a few minutes; other instances are given where the sheep graze the shrubs and go considerable distances to a water hole or stream and are killed after drinking water. Nearly always under such circumstances, the owner blames the water. Another bad time for such losses is in the fall at frost time; especially dangerous is frosted second growth sorghum (cane, used in making molasses). This occurs where animals are pasturing in cut-over cane or Atlas fields and very heavy losses have occurred this way. Even Sudan grass second growth may be dangerous from this standpoint.

There may be no more of the poisonous material present but the frost seems to make it more available and second growth is mostly leaves, the most dangerous part of the plant as far as hydrocyanic acid is concerned.

Such things as the type of soil, how heavily fertilizer has been applied (especially heavy nitrate applications), whether the plants are growing rapidly or are being stunted by dry weather, bruising the foliage (Sudan grass), any Sorghum crop in the process of wilting following cutting for the purpose of harvesting, and, undoubtedly, other factors tend to increase the content of the glucoside and make the plants more dangerous. Thoroughly cured hay, or silage that has completed its fermentation are not dangerous, as the hydrocyanic acid principle has been changed to a harmless substance.

Losses from corn fodder, cane stover and Sudan grass where it was fed wet but had been thoroughly cured before should not be blamed on prussic acid. Such losses are likely to be the same as oat hay poisoning in cattle. This is due to too much of the nitrate compounds being present and is really a nitrate poisoning. Veterinarians tell the two conditions apart by difference in the color of the blood and both these poisons kill by changing the normal blood so it cannot carry oxygen. The animal then dies of suffocation in the true sense of the word. Any

of the cereal grasses may be dangerous under the right conditions from nitrate content.

Another plant that is not generally recognized by owners as a possible cyanogenic plant is flax and the linseed cake made from the processed seeds. A little judgment in not feeding too much linseed meal or cake to starved out animals is necessary to avoid trouble with this excellent feed supplement. However, tests have been made which prove beyond a doubt that overfeeding of hungry animals on linseed products (cake, pellets, meal, etc.) can cause losses.

Symptoms of prussic acid poisoning, also known as hydrocyanic poisoning and cane poisoning, appear very suddenly and the animal may be dead in a very few minutes. The author has observed steers which took a mouth full of Red Amber (a variety of sweet cane) and were down in death throes within three or four minutes, before they could be driven from the cane patch.

Others have been killed by just reaching through the fence for a bite or two of sorghum growing along the pasture. Such animals are often found dead lying in the fence and the owner would expect lightning stroke had there been thunder storms in that vicinity. In areas where the sorghum crops are extensively grown, owners are wise to the deadly possibilities of this plant and take measures to keep their animals away from it except for Sudan grass (commonly known as SUSIE grass in districts where it is extensively grown for pasture and hay). There have been many cases of poisoning reported where cattle, especially, were on pastures of Sudan grass. In a large number of these, the Sudan was not a pure strain but was hybridized with one or more of the other sorghum varieties and under the right conditions, the mixed strains can cause trouble. The author has been familiar with Sudan grass for 35 years as a hay and pasture crop and it is excellent for both purposes if one is careful to follow accepted practices generally used by others in the district and IS SURE THE SEED IS SUDAN, not something else.

Johnson grass, mixed with domestic sorghums, also can cause trouble, especially if grazed under unfavorable conditions. It takes a person well trained in taxonomy to tell Sudan from Johnson grass unless one has the underground root system characteristic of Johnson grass. Johnson grass is a bad pest in many areas and a very valuable erosion control plant in others. It is a perennial and the Sudan grass is an annual (comes up each year from the seed).

Many of the hybrids of these two grasses with common field sorghums cannot be told from the

pure strain of the plant by examination even by an expert botanist. It is the opinion of the author that most outbreaks of prussic acid poisoning on Sudan grass have been actually on hybrids of Sudan with some other sorghum. There is the possibility that very injudicious use of the plant for pasture could cause loss. That soil conditions do enter into the picture with cyanogenic plants is an established fact by all who have made a study of the problem and it may be true that certain soil types associated with known or unknown factors, especially fertilizer practices would make Sudan grass an unsafe crop to use for pasture under given conditions. Such instances have been reported. Local conditions could also make other plants more desirable for the production of hay, as Sudan requires special handling to make the best hay.

As mentioned above, the symptoms, once they start to come on, progress very rapidly if the animal has eaten enough to kill it. The heart pounds, the breathing becomes very fast to a gasping type of convulsion, the animal opens its mouth and may pant like a dog, then collapse and die within a few minutes. Sheep may die before they move out of the water hole. Animals with less than the lethal amount of poisoning show less violent symptoms, that many times may be confused with simple indigestion. Rapid and extreme bloat is the rule and a bloody froth from the mouth or nose which may turn bright cherry red upon exposure to the air is sometimes observed.

This condition may be successfully treated with a specific antidote if prompt attention is possible at the time of the onset of poisoning. The heart continues to beat after respiration fails, and some of these cases that are down and nearly dead make a remarkable recovery following treatment. Some animals become very aggressive as they recover and may attack the handlers, so this should be guarded against. This is more true of cattle than sheep.

Due to the very rapid action of prussic acid, anyone that encounters this emergency should call the veterinarian at once, in order to save as many animals as possible. Describe the situation to him so that he can bring the proper antidote, then get the other animals out of that pasture into a dry lot and avoid letting the animals have water until the veterinarian arrives. Some of the animals stricken will probably be dead, but if treatment can be given while the heart is still beating, some will recover.

Much better than emergency treatment (which cannot always be given in time) is that procedure commonly known as PREVENTION. Before turning the

whole flock into a suspect pasture, give a good feed of hay, allow to water, then test the field with a few of the less valuable animals if there is any reason to suspect toxic plants are present, regardless what kind of poisonous plant. This common sense measure also protects against possible loss from bloat from green, fast growing legumes such as alfalfa, Ladino or other clovers.

The most common mistake leading to losses from the sheep (or cattle) eating toxic plants or bloating is to drive tired, hungry animals through or into a place where they can fill up on the toxic plant. This error has cost the lives of thousands of head of livestock in the past and it need not be repeated.

Chemical May Replace Lawn Mower

More uses are being lined up for maleic hydrazide, the chemical that seems to throw plants into low gear and keep them from growing for a while. It may substitute for pruning shears and the lawn mower, detassel corn, and hold back early flowering plants until danger of late frost is past.

At California experiment station the chemical was sprayed on half a hedge after it was trimmed, leaving half as a check. Three months later the unsprayed section had produced shoots from 12 to 15 inches long, 40 shoots to the square foot. The sprayed portion sent up one shoot to every square foot and these were less than two inches long.

Heavy applications of maleic hydrazide kill grass, but in smaller doses growth is checked and plants retain their fresh green appearance. Grass along roadsides and in parkways, sprayed with two pounds of the chemical an acre in early May by the Connecticut state highway department required only two mowings throughout spring and summer. Adjacent untreated sections had to be mowed 19 times in the season.

Scientists at Iowa State college learned that by spraying corn with 2,4-D at exactly the right time, it is possible to sterilize tassels. However, this chemical does not affect the tassel for a long enough period.

Maleic hydrazide stops development of tassels, and seems to act over a longer period than 2,4-D. It has been generally toxic to corn but scientists hope to find a time in the life of the plant—or some method of application—which will inhibit tassels without reducing stalk and ear growth. Chemical detasseling would be a boon to commercial growers because the job costs about 10 million dollars yearly.

— Capper's Farmer

Humus — and Lots of It — Will Cure Many Soil Troubles

THE KEY TO SOIL FERTILITY

Condensed From American Fruit Grower

R. E. Stephenson
Oregon State College

SOILS contain enough of the essential nutrient elements (nitrogen, phosphorus, potassium, sulfur, calcium, iron, magnesium, copper, zinc, manganese, boron and perhaps molybdenum) for several good crops, if the crop were able to extract the nutrient from the soil. Those nutrients which the plant is able to extract and use are called available, while those that refuse to leave the soil and enter the plant are called unavailable.

It is not the total quantity of nutrients present in the soil that determines how much the plant can use, though a high total in the soil may be a favorable factor from the long time point of view. Other things are of more immediate importance to the plant than the quantity present.

Plants differ not only in the amount of the various nutrients required for good growth, but they differ in the amount of root system, the development of the fine feeding roots to make soil contacts, and the depth to which the roots penetrate into the soil to extract nutrients.

Thus, walnuts fail to produce a crop because of boron deficiency where filberts thrive in the same soil. Strawberries are rather vigorous surface feeders, whereas raspberries require a deep soil where roots can penetrate and function.

Soil structure has been called the "key to soil fertility," because soil structure determines whether a profusion of roots can develop and send out root hairs that supply the absorbing surface for the root system. The ideal structure can be described as granular and spongelike. Such a soil holds moisture well, but is full of open channels to furnish good drainage, easy entrance of roots, and free interchange of air. This favorable structure is more likely to

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Cleveland, Ohio

be found in the medium texture soils, loams, silt loams and sandy loams.

Soils are only as deep as the roots penetrate and function, which may be from less than six feet to more than twice that depth for some plants.

Soil reaction (whether acid, neutral or alkaline) is a major chemical property influencing nutrient availability. The highest average availability of all the essential elements is found when the soil is near neutral. High acidity is unfavorable to most crops and predestines some crops to complete failure. High alkalinity, which is likely to mean black alkali, is disastrous to most crops.

Acidity occurs in humid climates and is due to lack of lime. Black alkali occurs in arid climates and is due to accumulation of salts, such as common table salt, which brings about changes that finally result in enough sodium hydroxide (a strong alkali) to stop most plants from growing. Soil acidity is easily corrected by liming, but black alkali is both difficult and expensive to treat.

The chemical combinations in which the essential elements are found in the soil influences their availability. Phosphates in combination with iron or aluminum are low in availability, whereas phosphates of calcium and phosphates of humus are much more available. Many of the nutrient elements are more available in humus combinations than when combined with clay.

Few things, therefore, contribute more to good nutrient availability than regular and adequate humus renewal. In good topsoil where there are more fine feeding roots than at any other depth, one-third or more of the total phosphorus, half to three-fourths the sulfur, all the nitrogen, and a considerable portion of all other major and minor elements are in organic combinations which are more readily liberated to a tree root or the feeding roots of any plant than are the rather inert mineral forms of these elements.

In areas of soil acidity humus prevents phosphates from reacting with iron and aluminum and thereby helps to keep them in a form that plants can use.

In areas of alkali soil, humus acts as a buffer to reduce the severity of the alkali and by improving soil structure helps to eliminate the alkali by washing the salt into the drainage with irrigation water.

There is scarcely an important property of any type of soil that is not improved by humus for the nutrition of plants. In addition to improving the soil, humus materials stimulate root development.

Other values of humus include the stimulation of the important living organisms that are essential

in all soils for freeing nutrients to the plant roots, for the production of growth stimulating hormones, for fixing free nitrogen of the air, for other nitrogen changes that are included in the processes of ammonification and nitrification; in short for converting an inert mass of material into a living and functioning soil.

Nothing else, other than irrigation or drainage as needed, can improve soil moisture properties more than adequate humus renewal. Whether organic materials for making humus are incorporated into the soil or left on the surface as a mulch, there is improvement of the important soil properties. Nature drops organic materials on the surface of the soil and provides earthworms, bacteria, fungi and other forms of life for incorporating the material into the deeper soil.

Any type of organic material, rightly used, is helpful, whether leaves of trees, lawn clippings, vines, stalks of plants, a green cover crop, compost, animal manure or straw. Even sawdust can be used to improve the soil. Humus is about 40 per cent lignin and 30 per cent protein. Saw dust has the lignin (is mostly lignin and cellulose), but a nitrogen fertilizer must be used to enable the soil organisms to manufacture proteins to balance the lignin.

Some of the best orchardists grow a permanent (or near permanent) cover crop and return all leaves and prunings to enrich and improve the soil. This with water (by irrigation, if necessary) and fertilizer as needed, contributes much toward big yields and high quality of fruit.

Most Gains for Feeders of Livestock

General livestock outlook for 1953 is lean, admits Robert C. Kramer, Michigan State college agricultural economist, but there are exceptions. Farmers who feed cattle and sheep will do better than those who produce them. Farmers who have hog breeding herds will make more money than in 1952, he explains.

Beef demands will remain about the same but there will be a record number of beef cattle in 1953 — 92 million head — and more will go to market. Producers will sell for less than in 1952 but the retail price will not drop much, as labor and marketing costs will not be cut. Feeder cattle prices are off about $10 and slaughter cattle about $5. The stock feeder who watches his costs can make money.

The 1952 hog numbers were off by nine per cent and there will be fewer going to market in 1953 but at a better price.

— *Michigan State College*

Concord Country

. . . What One Wild Grape Seed Did to Erie County, Pennsylvania

Condensed From Pennsylvania Farmer

Robert H. Williams

EPHRAIM W. BULL never set foot in Erie County, Pennsylvania. Yet this tight lipped Yankee, more than any single man, is responsible for that county's thriving grape industry.

Bull was a native of Massachusetts and the originator of the Concord grape. He had no master plan for Erie county. In fact, he probably never heard of it. But one day in 1843 he planted a wild grape seed. From it grew the first Concord seedling, the great, great granddaddy of all modern day Concord grapes. Bull's protege looked promising and was introduced by the Massachusetts Horticultural Society in the fall of 1852. After this initial endorsement, it spread rapidly across the nation.

A hardy plant and vigorous grower, it became noted as a top producer and easy keeper. Horace Greeley called it "the grape for the millions."

Today, 109 years after the first seedling was grown, it still dominates the vineyards of Erie county. Many vineyards are 100 per cent Concord. Despite countless years of research and scientific papers, no new grape variety has ever surpassed it in this territory.

In a visit through the Erie county fruit belt this summer, we asked why?

"No other grape can hold a candle to the Concord for the sweet juice market," says J. V. Meeder. A master farmer, Mr. Meeder planted the first commercial vineyard west of the city of Erie. That was in 1912. Thousands of acres of vineyards now line the lake shore between Erie and Conneaut, Ohio.

"And, more important," he added, "the only Concord grapes to amount to anything are grown along the Great Lakes." Other

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Pittsburgh, Pennsylvania

growers said much the same thing in many different ways.

First, a demand for Concords has been created by the processing industry. From this perennial favorite they make rivers of sweet juice, plus tons of jams, jellies and sundry other products.

Second, growers in Erie county and other lake shore areas hold a virtual monopoly on good Concord country. In California, Concords are a flop. A few Concords are grown commercially in Washington, Arkansas and Missouri, however.

The climate is most important. In the spring, Lake Erie warms up more slowly than the land. The reverse is true in the fall—thus extending the frost free season along the shore. Danger of late spring or late fall frosts are slight. This lake conditioned climate is also unfavorable to many plant diseases.

Ken Youngs, a fruit grower near North East, Pennsylvania, has seen the market change three time in his lifetime. And he is still a relatively young man. Thirty years ago, table grape demand siphoned three-quarters of all the grapes out of Erie county. During World War II, a boom in wine grapes developed. Fantastic prices were paid for Niagaras, Catawbas and Delawares. In recent years, the Concord has been the only grape to command much of a price—and that's for processing. Between 75 and 95 per cent of Erie's grape production now goes to the juice and jelly men.

Unlike the apple men, the grape growers see little danger in this strong shift toward the processing market.

Herb Burch, president of Keystone Grape Co-operative, remembers the years when carloads of iced grapes rotted at sidings and buyers stayed away in droves. Processing gives the grower the benefit of a 12 month market, he says.

"This has done a lot to stabilize the market and take the speculation out of grape growing," Mr. Burch feels.

Just how big an industry is grape growing in Erie county? Over nine-tenths of all the grape vines in the state put their roots down along Lake Erie, and the vineyards there still have growing pains. Numbering 4,719,000 vines in 1945, the figure climbed to over 5,657,000 by 1950. That's roughly 9,300 acres of grapes in Erie county alone.

About 25,000 tons of grapes were grown in 1950 — a record high. The 1952 production in Erie county is reported to have hit 16,000 tons.

Flip through a few pages of statistics and this is what one finds for 1952. Only four states will grow more grapes than little Erie county. Erie's production looks rather withered compared

to California's plump 2,848,000 tons, but it will still outproduce Ohio and 42 other states this year.

Growing grapes isn't any summer long siesta for fruit men. They face an annual battle against the insects and fungi that prey on the vineyards; hands must be found to get in the harvest; and vineyards must be cultivated, pruned and generally babied year round.

Drop in grape yields has been one major problem facing growers. The standard practice of clean cultivation has stirred the organic matter out of the soil. Erosion has taken its toll. With this and other problems in mind, growers raised funds to establish the Erie County Field Research Laboratory in 1946. The college now owns it.

Up at the laboratory they tell you that farmers once imported carloads of manure to lick the organic deficiency. Now, most farmers won't sell manure off their place and scientists must uncover other sources. Grape pumice, once burned by processing plants, is now being hauled to the vineyards and plowed down. So are stems, straw, old hay and prunings. These organic supplements work as well as manure when applied with nitrogen fertilizers.

Still in the experimental stages is the city sewage. It is a great untapped source of organic matter. But, state the research men, if all growers wanted to use these organic supplements, there would not be enough to go around. These men are now looking for ways to improve the organic content of vineyard soils by growing it right in the rows.

At the present time cover crops of rye grass are being used extensively. Some growers plant wheat for a winter cover.

As a rule, they find, grasses and clovers depress grape yields, if no cultivation is done. However, one six year study at the laboratory did show definite results. Ladino clover was used for three years on badly eroded soil. Commercial fertilizer was applied heavily. For the next three years the plots were clean cultivated and planted each fall to cover crops. Yields from these plots over the six years were higher than adjoining plots which were fertilized just as heavily but clean cultivated during the full test period.

Remember, this soil was in bad shape and needed a "shot in the arm." Production figures revealed Ladino sod does temporarily depress yields. But such plots catch up and pass clean cultivated plots once they go back into cultivation.

Many another new idea is coming out of the laboratory. These include new sprays and new cultural practices for all types of fruit and vegetables.

Master farmer S. S. Lehman

says the labor problem makes fresh vs. processing grapes a purely academic question.

"The picking and shipping costs are much too high," he states. He sees this demand on hand labor as a major drawback of fruit growing today. Biggest saving has been in spraying. Now one man can do the work of three.

John Archer was just finishing up a round of spraying when we arrived at his 160 acre fruit farm. He covers four to five acres of vineyard per hour with his rig—a 600 gallon outfit that a boom switch converts into an orchard sprayer.

Like a lot of growers in Erie county, Mr. Archer has been yanking out apple trees. We saw 22 acres of his apples — stumps and limbs—in one gully hard by Lake Erie. Hybrid tomatoes followed the apples but grapes will eventually go in permanently.

And the way these grapes go in proves how unconventional Erie grape growers are. In one vineyard, Mr. Archer used split railroad ties for his posts. The railroad gives them away rather than pay the cost of hauling and burning. Already creosoted, the ties last for years. When he was ready to go, Mr. Archer used his post hole digger to plant the grape roots as well as posts. In the old method the growers plowed a furrow to plant the roots. But this left the field rough. One spread of grapes Mr. Archer showed us had 9,450 vines and was as level as a kitchen table.

East of John Archer's place, we found John Stone readying his cold storage for the new fruit crop. Mr. Stone uses a three ply aluminum blanket for insulation. According to him, the total job costs less than half the price of conventional insulation. That's throwing in the cost of the compressor, too. Mr. Stone can get by with a two horsepower compressor although a five horsepower compressor was recommended for conventional siding. It also cuts cooling costs.

This aluminum blanket, however, has its drawbacks. It tears easily and needs special protection. Some growers use hardware cloth, others use laths to prevent such damage.

Another vineyard innovation that we haven't seen elsewhere is the hydraulically operated "horse hoe." J. R. Ziesenheim, another master farmer in the Erie fruit belt, showed us his. It has a flat blade which shoots out or in to avoid vines, but catches the weeds along the row.

Liberty means responsibility. That's why most men dread it.

Careful Planning and Skillful Handling of

THE SWINE BREEDING HERD

Pays Big Dividends in Larger, Healthier Litters

Condensed From The American Hampshire Herdsman

John F. Lasley

University of Missouri

PAST experience has shown that there is always a good demand for top quality breeding animals, and the production of this kind of hog combined with highly efficient production practices should always make the purebred business a profitable one.

The efficient production of hogs begins with the breeding season. Attention to proper management of the herd during this period will pay off later in the production of larger healthy litters of pigs.

The old hand at the purebred hog business has become well acquainted with the months he would like his pigs to be farrowed. For the beginner, however, it should be pointed out that consideration should be given to farrowing in the spring in order to have good legume pasture available when the pigs are 2 to 3 weeks of age. Clean ground and good quality pasture make sow and litter management easier, insure a rapid growth rate and favor the production of strong, healthy pigs.

Management of the Boar

Many times too little attention is paid to the care, feeding and management of the boar during the breeding season. Improper care and feeding may lessen the ability of the boar to perform as many services as needed and may even affect his fertility. Lowered fertility may be responsible for very small litters at farrowing time or to the failure of sows to settle readily when mated at the first heat period. The failure of sows to settle means a longer farrowing season and a less uniform crop of pigs.

About three or four weeks before the start of the breeding season, preparations should be

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Peoria, Illinois

made toward getting the boar in breeding condition. Plenty of shade and water along with an abundance of green feed and exercise will help to accomplish this aim. If the boar is thin, his ration of grain and protein should be increased to 1.5 pounds per 100 pounds of body weight per day in order to bring him rapidly toward breeding condition. Plenty of protein is necessary for the formation of the male sex cells and semen fluids produced at the time of mating. If he is already too fat, the feeding of a small amount of a complete ration and large amounts of green feed together with forced exercise will help better his breeding condition. Boars that are too fat tend to be slow breeders.

Spraying for lice and mange with Lindane or some other recommended compound will help eradicate these external parasites and favor a more healthy condition of all animals in the breeding herd including the boar. The removal of the tusks of the boar is also an important management practice because it will lessen the danger to the herdsman if mature boars suddenly become vicious.

During the breeding season the boar should be penned separately from the sows to avoid ranting. This is especially important if he has a heavy breeding schedule. Many breeders make a practice of checking the sow herd with a younger, more active boar that is not being used too heavily for breeding purposes. Such a practice will help conserve the energy of the older boar until he is actually needed for mating purposes.

Boars vary a great deal in their natural vigor and in the numbers of sows they can breed during a single breeding season. Mature boars that are in good breeding condition and are active can breed two or three sows per day and possibly more if the services are spaced at intervals of a few hours. It useless to breed the same sow more than once within a period of a few minutes or an hour unless the first service was incomplete. The number of services a boar can continue to perform during the breeding season will depend on the length of this period and the number of sows to which he is to be mated. A heavy breeding schedule for two or three days may be satisfactory if it is followed by a short period of rest. An extremely heavy breeding schedule over a period of two or three weeks may result in the boar becoming inactive. Mature boars that are fertile are more likely to become inactive from over use than they are to become infertile. However, overuse of boars of low fertility may result in a still further decrease in fertility, the production of small litters at farrowing and the failure of many

sows to become pregnant.

Young boars which are being used for the first season often can perform one or two services per day if such a practice does not continue over a long period of time. Young boars should be handled with care in order to get them started off properly during the breeding season. Some individuals may be timid and may fail to mate if handled too roughly. On the other hand, some may be too active and may rant and go off feed. When this occurs they often can be induced to eat their feed and become quieter by penning them with a barrow or bred gilt. The competition at feeding time often will cause the young boar to eat more than if he were fed alone.

The breeding crate is a very useful piece of equipment when large, heavy boars are to be mated to gilts or when young boars are mated to older, larger sows. Sometimes the boars have to be trained to use the crate but once they become accustomed to it they will work readily. The use of a crate almost always insures a complete service which may be important in settling a large percentage of the sows and in producing large litters.

Management of Sows and Gilts

Litter size at farrowing is controlled by the numbers of eggs shed by the sow at the time of breeding, the number of eggs that are fertilized and the embryonic death loss of the pigs before farrowing. In general, it is desirable for the sow to produce a large number of eggs in order to favor the farrowing of large litters. Here, again, the feeding of good pasture to both sows and gilts is an important management practice.

The question is often asked as to the best age to breed gilts. There is no single answer to this question that will fit all cases, but it may be said that in general the older and growthier the gilt at mating the more eggs she is likely to shed and the larger litters she is likely to farrow. Gilts which weigh less than 200 pounds or are younger than five months of age probably should not be bred unless the end of the breeding season is approaching. Nevertheless, many times such gilts can be bred with satisfactory results, but more often than not poor results follow such a practice.

Recent evidence from at least two agricultural experiment stations indicate that gilts which are very fat may ovulate more eggs when they come in heat, but they actually farrow fewer pigs than gilts that are thinner but still in a vigorous and thrifty condition. Too much fat seems to lower fertility in almost all species of breeding animals.

The mature sow will often come in heat and can be bred

three to four days after the pigs are weaned, providing she has not come in heat a few days previously while nursing her litter. Breeding at this time is quite satisfactory and is often practiced when two litters are produced per year. In those cases when the breeding season is coming to a close and the owner desires to shorten the farrowing season the next spring, many of the sows can be bred while still nursing litters. Sows that are on a full feed on pasture often come in heat five to seven weeks after farrowing even though the pigs are still nursing. By keeping close watch on the sows at this time or by checking them with a boar, many of them can be found in heat and can be bred. Sows also can be brought into heat during the nursing period by separating them from their pigs for four or five nights in succession. Results indicate that breeding at this time is quite satisfactory from the standpoint of litter size at farrowing.

The rations of dry, thin sows should be increased to 1.5 to 2.0 pounds per 100 pounds of body weight per day in order to have them in a gaining condition at breeding time. This is known as flushing and is thought to favor the production of a larger number of eggs and the farrowing of larger litters. It would be unwise to wean the pigs from a sow and try to flush her at the same time because of possible danger to the udder through the stimulation of milk production. However, the weaning of the pigs and the cessation of the milk flow may actually serve the same purpose of flushing because the nutrients normally channeled to milk production will be used for gains in weight and the operation of body processes.

Two or more services during the heat period at intervals of 12 hours or more has resulted in 20 per cent more sows settling during the first heat period than when one service was given. Such a practice also seems to favor the production of slightly larger litters of pigs at farrowing time. Whether or not it is practical to give each sow or gilt two services at 12 to 24 hour intervals during the same heat period will depend on how much the boar is being used. If only one service is given it probably would be more effective on the second day of heat which is nearer the time the eggs are shed from the ovary. However, care must be taken that the sow does not go out of heat before she is bred when a practice is made of breeding on the second day.

The management of the breeding herd so that the sows produce large numbers of eggs which survive to the time of farrowing is an important consideration. No litter can be any larger at farrowing time than the number of eggs fertilized at the time of maturing.

Lightning Protection on Farms

An Electrical Expert Tells What to Do and How to Do It—

Condensed From Florida Grower

A. M. Pettis

Farm Electrification Specialist

LIGHTNING is one of the greatest single causes of farm fires. Besides causing fires it also damages property and kills or injures many humans and livestock each year.

There are two ways that lightning may damage the farm. One is direct damage to buildings whether wired or not. The other is damage resulting from lightning surges that come in on the electric line.

Lightning rods, properly installed, give almost complete protection from direct damage. A poorly installed lightning rod system gives a sense of false protection and may become costly with a lightning loss.

When having a lightning rod system installed, a farmer should obtain the services of an experienced lightning protection man. By getting bids and dealing with a dependable firm a person is most likely to get a satisfactory installation. The protective materials used and method of installation should conform to the "code for protection against lightning" by the National Bureau of Standards, and meet the standards of Underwriters Laboratories.

Even though protected with lightning rods, buildings and equipment may be damaged by surges coming in on power lines. To take care of these surges, a special type of condenser has been designed that acts as a lightning arrestor. Any good electrician can install one of these condensers at the service entrance or switch box in each building.

With rural people investing much money in electrical equipment such as television sets, radios, motors, lighting and heating devices, protection against lightning surges becomes even more important.

If a farmer does not buy the special condenser mentioned, he may follow some simple precautions that give a certain amount

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1306 Grand Central Avenue, Tampa, Florida

of protection. He can make certain that the electric service is properly grounded. Power suppliers generally require that an eight foot ground rod be used at the meter and at buildings with electric service.

The Southeastern Underwriters Association recommends that to give best protection to electric water heaters and other equipment, the neutral conductor should be bonded to water tank or piping. Where an electric system is grounded to water pipes, it should also have the usual ground rod. If it were grounded only to a water pipe, the water level in the well might drop below the pipe and there would be no ground.

Some people turn the main switch off during lightning storms. Lightning would have to jump the switch to follow the wires into the house so this step would give some additional protection. *However, lightning has been known to jump switches on many occasions. During severe flashes of lightning, electrical equipment could be disconnected from the wall outlet to give even more protection.*

Farmers having television sets should have the antenna grounded. To have an experienced man install the ground is not expensive, especially when compared to the cost of damage which can result from lightning.

A No. 6 copper wire should be connected from the television mast to the ground rods located as close as possible to the base of the mast and driven at least eight feet deep. A lightning arrestor carrying the Underwriters Laboratory (UL) seal should be installed in connection with the lead-in wire, and connected to the ground wire.

Shelter in Storm

For rural people caught in thunderstorms, a good shelter would be one of the following in the order from best to poorest:

1. Buildings protected from lightning.
2. Automobile with metal top.
3. Large unprotected buildings.
4. Small unprotected buildings.

In all cases, stay away from open doors and windows, fireplaces, stoves and other metal objects. If a person is outdoors and unable to find shelter, he should keep away from wire fences and trees, particularly single trees on high ground.

Dairy Herd Improvement Association records show that a cow has to produce more than 5,000 pounds of milk a year or she has a slim chance of making any profit for her owner.

At end of November farmers' prices in the United States averaged one per cent below parity, according to the Bureau of Agricultural Economics. It was the first time they fell below parity since June, 1950.

New Way to Turn Eggs Hatches More Chicks

Condensed From Missouri Ruralist

A NEW METHOD of turning hatching eggs in the incubator which increased the percentage of hatch from 1 to 8.1 per cent of all eggs set has been developed by poultrymen at the University of Missouri. The new method of turning eggs, which is called multiple plane turning, was developed by Dr. E. M. Funk and Prof. James F. Forward at Missouri College of Agriculture. It may save hatcherymen several million dollars annually through improved hatchability.

The process developed by Funk and Forward eliminates much of the loss from dead embryos during the later stages of incubation. Multiplane turning reduced the percentage of embryos developing with head between thighs, feet over head and beak away from the air cell. There was a relative decrease of 73 per cent in the embryos with head between thighs. However, multiplane turning increased the incidence of embryos with head in the small end of the egg.

What is multiplane turning?

Briefly, multiplane turning is turning the eggs in several positions or on several planes. Commercial incubators in use today tilt eggs in two positions only, but Funk and Forward tilted there eggs in six different positions. In fact, the present research probably more nearly approaches the way the hen turned the eggs before the day of the incubator!

Why does more turning aid in hatchability?

Dr. Funk says reasons for beneficial effects of turning are not known, but reasoning behind research reported is that frequent turning brings the embryo in contact with fresh egg material and provides more suitable nutrition for the embryo. It also aids in more favorable orientation of the embryo and thereby promotes more normal development.

In each experiment there was an increase of hatch in all eggs, and an average of three per cent better hatch than those from eggs incubated under identical conditions in the same machines.

"Quality of chicks at the end

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Kansas City, Missouri

of 21 days of incubation was definitely better when eggs were incubated in multi-positions," Funk said. They hatched several hours earlier and were "fluffed out" before the chicks incubated in the conventional manner. However, 24 hours after the chicks were in boxes these noticeable differences had disappeared.

Funk emphasized that many additional experiments will be needed to clarify and answer the many problems suggested by these results. Hatcherymen should not expect incubators embracing this method of turning for some time. Manufacturers of incubators were invited to Columbia in June and had a preview of these results, but they will no doubt want to experiment with this principle in their own machines.

New Federal Swine Grades

Here's a summary of the new grades for slaughter barrows and gilts and their corresponding carcasses:

Choice No. 1 — Slaughter hogs with about the minimum finish required to produce high quality pork cuts. Carcasses have a relatively high ration of lean to fat and usually yield about 50 per cent of their carcass weight in the four lean cuts of hams, loins, picnics and Boston butts.

Choice No. 2 — Slaughter hogs producing high quality pork but slightly overfat and yielding carcass cuts that require somewhat heavier trimming. Carcasses usually yield about 45 to 48 per cent of their carcass weight in trimmed loins, hams, picnics and Boston butts.

Choice No. 3 — Slaughter hogs producing high quality pork but decidedly overfat. Carcasses yield a somewhat low proportion of lean cuts and a high proportion of fat. These carcasses normally yield less than 45 per cent of their weight in the four lean cuts.

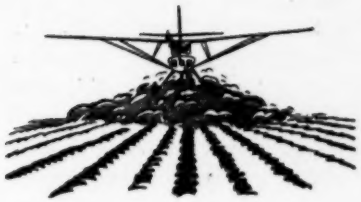
Medium — Slaughter hogs which are slightly underfinished and as a result produce flabby and slightly soft cuts with little marbling. These cuts are of medium quality. The yield of lean cuts is proportionately high but the ratio of total lean and fat to bone is slightly low.

Cull — Hogs of this grade are decidedly underfinished, and although they produce carcasses with a high ratio of lean to fat the cuts are very inferior in quality and are suitable only for use in processed meats.

The grades, which are the result of several years of research, will supplant present tentative standards for live hogs and establish for the first time standards for pork carcasses.

— Washington Extension Service

Progress Report on . . . Liquid Fertilizer



Condensed From Better Farming Methods

Dr. V. A. Tiedjens

LIQUID fertilizer has brought on a new era of leaf feeding, starter solutions, side dressing, and seed treatment. Some of its uses and methods of application are so new that little has been written about them. This progress report will help summarize the experience reported by agronomists, growers and manufacturers.

The inherent advantages which have spurred the commercial development of liquid fertilizer include the following:

Ease of Application — Farmers using water soluble weed killing or insecticide solutions on their crops can fertilize while they spray for other purposes by simply adding liquid fertilizer to the spray solution. It can be applied with any standard spray equipment. Nutrients, in concentrated form, can be sprayed by airplane with a minimum of reloading stops. The nutrient content of a drum of liquid fertilizer is high; consequently, storage and handling are not serious problems.

Efficiency — Liquid fertilizer contains nutrients in the only form a plant can use them . . . not in suspension but in complete solution. Since liquid fertilizer is applied to the plants rather than to the soil in most of its uses, the plant can make greater use of the nutrients. Dry fertilizer must await rainfall to dissolve the nutrients . . . and the plants get the portions not washed away. Particularly in foliage feeding, tests have indicated that practically all the applied nutrients in liquid fertilizer are actually absorbed either through the leaves or the roots.

Variety of Uses—Liquid fertilizer is being used on an increasing number of farms for (1)

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Mount Morris, Illinois

foliage feeding; (2) as a starter solution for seed beds and in transplanting; (3) for seed treatment; and (4) as a side dressing. It is used widely on grains, forage crops, vegetable crops, in orchards . . . and housewives are using it in their home vegetable gardens, on their flower beds, shrubs and lawns.

Existence of Application Equipment—One factor that has hastened the use of liquid fertilizer on farms is the fact that spray equipment often is available to apply it. Spray equipment, particularly in some sections is widely used. Aerial application equipment is available on a contract basis in most parts of the country. For seed treatment, no special equipment is required except for large amounts of grain, where a cement mixer or portable grain elevator makes ideal mixing equipment.

Easily Tested on the Farm—Because liquid fertilizer is so new and so many of its uses are still in the development stage, reputable commercial producers have been conservative in their claims about what liquid fertilizer can accomplish, in spite of impressive performance reports from many users.

Manufacturers have pointed out that variations in soil conditions and many other factors need analysis over a period of years before accurate predictions of performance can be made. Consequently, liquid fertilizer has been promoted largely on a "you try it" basis, since it is not difficult to test it in various ways in any one year. By treating seed for a portion of a planting, farmers can make their own test with little effort or expense. For transplanting, the test is made by adding liquid fertilizer to the water used in transplanting a portion of the plants. For foliage feeding, a test can be made by adding liquid fertilizer to spray solutions on a portion of the planted area. At the same time, the liquid nutrients can be applied to portions of lawns, flower beds, gardens, etc.

A Look Toward the Future

The experience of individual farmers in widely scattered areas and on many different crops and through many different methods of use indicate that liquid fertilizer is making a substantial impact on the farming practices of the nation. Some of the documented reports which follow, plus the reports of individual users, indicate that liquid fertilizer can help affect the strength of plants, their yield, their nutrient content and their maturity date. Liquid fertilizer seems to fit in with the trend toward constantly greater mechanization of farming, due to rising farm labor costs and the growing pressure to take drudgery out of farming. The years ahead

hold the answer to the question about the role liquid fertilizer will play in the farming practices of the future, but experiences of the past several years indicate that it has a promising potential.

Much confusion has been created by efforts to compare liquid fertilizers with dry fertilizers. In spite of the many factors they have in common, there are important differences that should be kept in mind — basic differences that every person can appreciate.

For example, some efforts have been made to compare liquid and dry fertilizers on the basis of their nutrient content. Such a comparison is misleading when it deals only with the amount of nutrients applied; fertilizer nutrients pay dividends only when they are absorbed by the crop. Consequently, if identical amounts of nutrients are applied, it may be that only 10 to 25 per cent of the nutrients in dry fertilizers would be absorbed in any one crop year, whereas 80 to 90 per cent of liquid fertilizer sprayed on foliage in a leaf feeding program are likely to be absorbed, when compared in repeated tests. Where equal quantities of plant nutrients have been applied, more crop yields have been grown with the same amount of fertilizer because of the ease with which the plants will absorb the nutrients.

Another important consideration is the cost, in time and effort as well as expense, of applying nutrients. Many scientific experiments often overlook such considerations as the handling and application problems which can be nearly as important from a practical view as the comparative results obtained in tests. Handling heavy bags, loosening fertilizer that has drawn moisture and hardened and other similar problems can frequently influence a farmer's fertilizing practices. The ease with which six or seven bushels of grain seed can be treated with a gallon of liquid fertilizer, or the simplicity of pouring liquid fertilizer in with any water soluble weed killer, insecticide or fungicide spray solution makes the application of liquid fertilizer a comparatively quick, easy job. Mixing liquid fertilizer in the water used in transplanting or in the water applied to seed beds is likewise an easy task.

When liquid fertilizers were first introduced commercially, manufacturers offered them entirely as a substitute for dry fertilizers. It has been the growers rather than the manufacturers who have pioneered in the combination of seed treatment and leaf feeding as a substitute for conventional fertilizing practices.

Leaf Feeding

Leaf feeding is the newest commercial use of liquid fertilizer—

and the use that today appears to hold the greatest potential.

Three basic facts about fertilizers point to the sound logic behind leaf feeding:

(1) Scientific tests have proved that plants can absorb important amounts of nutrients through their leaves. These tests also show that nutrients absorbed through the leaves feed the entire plant structure just as readily as food absorbed by the roots.

(2) Nutrients must be in liquid form before a plant can absorb them. Liquid fertilizer doesn't await rainfall to make it effective. Its nutrients are immediately available to plants.

(3) Plants do well to absorb 25 per cent of the dry phosphate nutrients applied to the soil in any growing season, but tests show that up to 90 per cent of nutrients sprayed on leaves are absorbed either through the leaves or through the roots when it washes off the foliage.

Leaf feeding has some inherent advantages not obtainable in any other way:

(1) It can be done without any cost except for materials when liquid fertilizer is added to compatable solutions used in weed killing, insecticide, or fungicide spraying programs. This no cost method of applying fertilizer becomes increasingly important as farm labor becomes more scarce and more costly.

(2) Liquid fertilizer can be applied at a convenient time during the crop's growth, and the frequency of application can be varied to meet the crop's needs. If adverse weather delays a crop, spraying with liquid fertilizer can help the crop make up for lost time.

(3) Liquid fertilizer makes it possible to feed a crop quickly and easily by aerial application. Planes equipped with tanks can carry enough liquid fertilizer, undiluted, and spread it evenly enough to cover substantial acreages without landing to refill their tanks. Crops can be fed by this method at any desired time during their growing period.

Transplanting

Regardless of how good soil conditions may be, transplanting time is a critical period for any plant. Wilt may kill a plant before it overcomes the shock to its entire system caused by the change in soil and the absence of the protection it formerly had.

One factor favoring the use of liquid fertilizer in transplanting water is the immediate availability of the nutrients to the plant. Tests show plants can absorb liquid nutrients within a matter of minutes. These nutrients are available to help plants, particularly in the first few days when the percentage of casualties among transplants is highest.

Adding a small amount of li-

quid fertilizer to the water in the barrel on the transplanter makes an easy means of application.

Liquid fertilizer is widely used in this manner among commercial and individual growers of tomatoes, tobacco, cabbage, celery and other transplanted crops.

Growers also use liquid fertilizer in seed beds as a starter solution on seed, and side dressing on plants before they are ready for transplanting. Simple mechanical devices to mix measured amounts of liquid fertilizer with watering systems are readily available, simplifying the task of applying the plant food in desired amounts.

The use of liquid fertilizer both in seed beds and in transplanting, plus perhaps additional applications in the form of side dressing or foliage feeding, is practiced by growers for different purposes. In some instances, there is only a desire to make the yield as great as possible. In others, hastening the maturity of a crop by several days can enable the grower to obtain premium prices or to harvest before frost. In still others, growers are concerned with extra quality crops with which to bid for premium prices.

Side Dressing and Irrigation

Side dressing is the process used to apply plant nutrients to the soil near the roots of growing plants. The advantage of using liquid fertilizer is that it is immediately available for use by the plant.

One general way of accomplishing side dressing is to permit a small stream of liquid fertilizer diluted in water to run directly into the soil near the row being cultivated; conventional row cultivators can be fitted with a tank and the necessary hose or piping to do this.

The application of liquid fertilizer as side dressing is most widely used among truck farmers who own and operate crop watering equipment rather than depending entirely on rainfall for moisture. Among such growers, the premium prices obtained for early maturity and select produce provides an extra incentive for supplemental fertilizing. Any type of equipment used to apply water along crop rows can be used in side dressing with liquid fertilizer.

Another method of applying liquid fertilizer as a side dressing is through irrigation.

Regarding the use of liquid fertilizer in irrigation water, the United States department of agriculture in a recent paper reports the following: "Fertilizer applied in irrigation water should be completely soluble and not subject to precipitation and removal as a result of reactions with salts normally carried by the water. Some of the advantages of applying fertilizer in irrigation water are: (1) It permits more even distribution,

(2) application can be made when size of crops prevent application by other means, and (3) some forms of fertilizer might be most economically used by application in irrigation water."

There are a variety of ways of using liquid fertilizer in irrigation systems. These range from the siphon attachments which connect with sprinkling hoses, to open ditch systems. Overhead sprinkler pipe systems and ditches can easily be adapted for liquid fertilizer application, simply by inserting a "side arm" into the pumping system. Calibrate the system to determine the rate of flow, and allow liquid fertilizer to be drawn through the "side arm" at the desired rate.

Will it work every time?—The factors which influence the growth and yield of any plant or crop are too numerous and complex for any fertilizer manufacturer to guarantee uniform results. Reputable commercial producers of liquid fertilizer have been particularly cautious about making broad claims for their products. Variations in the quality of seed, the differences in the needs of various soils, even differences in the time of application and the weather conditions which follow can make important differences in results.

In soils containing all of the elements needed by a crop, the application of any fertilizer will make little appreciable difference in yield. Some soils may be rich in most nutrients but deficient only in the trace elements, such as magnesium, calcium, manganese and boron found in liquid fertilizer. Or they may lack such important elements as phosphorus, nitrogen and potash. It is only natural that soils, seeds and other factors will affect the results obtainable through the use of liquid fertilizer. It is because of these variations that different tests lead to different results—and why commercial producers of liquid fertilizer are urging farmers to make simple tests on their own crops and judge for themselves the benefits they can obtain.

General experience among growers to date indicates that favorable results can be expected in a majority of instances when liquid fertilizer is applied properly for leaf feeding, as a side dressing or as a transplanting, starter or booster solution. Seed treatment is reported to have produced favorable results in a majority of tests, particularly among cereal grains, apparently helping to speed the germination of the seed and assisting in the formation of its initial root structure.

There'll be plenty of eggs in December, 1953. It's the man who has plenty of eggs in September and October who will be happy that he started chicks early.

BEEF CATTLE

Cheaper Beef Gains .....Mar., 1952
Hormones Lower Beef Costs .Mar., 1952
Nutrition During Gestation ..Mar., 1952
The Best Steer to Eat Grass..Apr., 1952
Beefmasters .....Apr., 1952
Lowering Beef Cattle Costs ..Apr., 1952
Brangus Cattle .....Apr., 1952
Know-How Raises Quality Beef .....Sept., 1952
Calving to Market at 15 Mos. May, 1952
Will Feeder Cattle Pay .....Oct., 1952
Make Beef for 14 Cents .....Oct., 1952
History of Beef Cattle .....Nov., 1952
Winter Feeding Beef Cattle ..Dec., 1952

CONSERVATION

Ground Cover for Sandy Soils.Apr., 1952
A Valley Is Reclaimed .....Oct., 1952
Earth Takes Big Drink .....Oct., 1952
Clear Pond Water .....Nov., 1952
Drained $75,000 Ranch .....Dec., 1952
Should Cattle Graze Woodlot .Dec., 1952

CROPS

How to Choose Hybrid Corn.Apr., 1952
More Corn on Less Land ....Apr., 1952
Corn Production .....Apr., 1952
Growing Brome Grass .....May, 1952
A Corn Champion's Story ....May, 1952
Make Corn Your Nurse Crop..May, 1952
Irrigation .....May, 1952
Better Grass for More Corn ..May, 1952
Red Clover Comes Back .....July, 1952
Why I Believe in Conservation .....Sept., 1952
Costs to Harvest Grass Silage.Oct., 1952
Male Sterile Corn .....Dec., 1952
Corn Following Corn .....Jan., 1953
Your Corn Harvest .....Jan., 1953
New Way Alfalfa Seed .....Jan., 1953

DAIRY CATTLE

Calf Scours Controlled .....Mar., 1952
Outwitting Mastitis .....Mar., 1952
Typed Classifications .....Mar., 1952
New Breeding Remedy .....Apr., 1952
How Much Milk Will a Cow Give? .....Apr., 1952
Herd Sire Index .....Apr., 1952
Cow Comfort and Ventilation.Apr., 1952
Improving Dairy Herds .....Apr., 1952
Calves Need Roughage .....Apr., 1952
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Calf Management .....May, 1952
Herd Sire Problem .....July, 1952
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Box Score, Artificial Breeding .....Jan., 1953
Loose Housing .....Jan., 1953
Ketosis, Latest Research ....Jan., 1953

FARM BUILDINGS

Cow Comfort and Ventilation.Apr., 1952
Top-of-Ground Silos .....Sept., 1952
Pole Type Poultry Shelter ...Oct., 1952
Heat Pumps for Farm Homes Nov., 1952
Poultry House Ventilation ...Nov., 1952
Saving Sweat in Silo .....Nov., 1952

FARM MANAGEMENT

Cutting Production Costs ....Mar., 1952
When You Buy Credit .....Apr., 1952
I'll Be Suing You .....May, 1952
Oil Under Your Farm? .....May, 1952
Don't Buy a Fooler Farm ...July, 1952
Lease That Will Last .....July, 1952
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Farm Fire First Aid .....Sept., 1952
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Insurance for Farmers .....Nov., 1952
Advice at Budget Price .....Dec., 1952
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Before You Buy a Farm .....Jan., 1953
1952 Income Tax .....Jan., 1953

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Fuel for Farm Tractors .....Apr., 1952
Farming With LP Gas July,.1952
Portable Electric Motors ....July, 1952
Tractor Tire Tests .....Nov., 1952
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When Power Fails .....Dec., 1952
New Stubble Gulper .....Dec., 1952
Let Machinery Work .....Dec., 1952
Winterproof Waterer .....Jan., 1953

FEEDS

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Backaches Vanish .....May, 1952
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Too Much Sunshine .....July, 1952
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Barn Yard Listening Post ..Sept., 1952
Report on Hay Crushers ....Sept., 1952
He Feeds Everything That Grows .....Oct., 1952
Fitting Concentrates to Roughage .....Nov., 1952
Feed Grass Silage .....Dec., 1952
Best Feed Buy .....Dec., 1952
How to Feed Poor Hay .....Jan., 1953

FERTILIZERS

Mineral Needs of Livestock ..Feb., 1952
Manure—Top Soil Builder ...Mar., 1952
New Soil Conditioner .....Mar., 1952
Cornstalks Decrease Yields ..Sept., 1952
Topdressing Meadows and Pastures .....Sept., 1952

Get Organic Matter Quick ...Oct., 1952
Build Fertility and Keep It ..Nov., 1952
Productive Fields .....Jan., 1953

FORESTRY

Be Your Own Woods Boss ...Mar., 1952
Put the $ Sign on Decay ....Feb., 1952
Story of the Tree Farm .....Nov., 1952
Managed Wooldand .....Jan., 1953
FFA Grows Seedling Trees ..Jan., 1953

FRUIT

Spraying Apples
for Less Money .....Sept., 1952
Check Rodent Damage .....Dec., 1952
Behold! The Lychee .....Jan., 1953

HOGS

Better Hog Production .....Apr., 1952
Antibiotics for Pigs
on Pasture .....Apr., 1952
Infectious Rhinitis .....May, 1952
Farrowing Stalls for Sows ...May, 1952
Self-Feed Nursing Sows .....May, 1952
Hogs Need Less Protein .....July, 1952
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New Antibiotic Pig Pellet ...Oct., 1952
Pastured Pork Costs Less ...Oct., 1952
Profit With Hogs .....Nov., 1952
Plan Pork Production .....Dec., 1952
Town of Ham .....Jan., 1953
Cheaper Hog Gains .....Jan., 1952

INSECTS and INSECTICIDES

New Farm Chemicals .....Apr., 1952
Pest Control .....July, 1952
Weevil Meets Match .....Nov., 1952
Electrons Ride Bug Dust ....Nov., 1952

PASTURES

Soil Fertility and Pastures ..Mar., 1952
New Pasture Every Morning.Mar., 1952
Control of Broomsedge .....Apr., 1952
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for Legumes .....Oct., 1952
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Grass the Money Maker .....Jan., 1953
New Seed Treatment .....Jan., 1953
Why Pasture
Scored Excellent .....Jan., 1953

POULTRY

Should Grocers Buy Eggs? ..Apr., 1952
Skillful Feeding
Gives Results .....Apr., 1952
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Atomic Age Hits Poultry ....May, 1952
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Hormonizing Chickens .....May, 1952
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Barnyard Goose .....July, 1952
Farm Assembly Line .....Sept., 1952
Gozzis' Turkeys Sell Retail ..Oct., 1952
Poultry Practices That Pay ..Oct., 1952
What's New in
Poultry Feeding .....Nov., 1952
How to Feed Layers .....Dec., 1952
Duckland U. S. A. .....Dec., 1952
Do Hatching Eggs Pay? .....Dec., 1952

SHEEP and GOATS

Parasites Take
Sheepman's Profit .....Mar., 1952
Sheep Industry in Ohio .....May, 1952
Money in Sheep .....July, 1952
Two Lamb Crops a Year ....Sept., 1952
Breeding, Feeding for Wool .Oct., 1952
Feed Lambs Like Hogs .....Nov., 1952
Sheep Make a Profit .....Dec., 1952
Makes Money on Sheep .....Jan., 1953

SOILS

Soil Fertility and Pastures ..Mar., 1952
Is My Soil Deficient? .....Mar., 1952
Manure—Top Soil Builder ...Mar., 1952
New Soil Conditioner .....Mar., 1952
Is Your Farm Hungry? .....Apr., 1952
Atoms Aid Plant Research ...Apr., 1952
Test Your Soil Vocabulary ...May, 1952
Soil Organic Matter .....July, 1952
Land Judging Contest .....Oct., 1952
New Nitrogen Soil Test .....Dec., 1952
Soil pH Explained .....Dec., 1952
Sweet Soil From Plain Dirt ..Dec., 1952

VEGETABLES

Vegetable Growing Business .Nov., 1952

WEEDS

Killing Weeds
With Chemicals .....Feb., 1952
McGregor vs. Mesquite .....Nov., 1952
How Much for Weeds .....Nov., 1952

MISCELLANEOUS

History of Agricultural Fairs.Mar., 1952
Japan's Extension Service ...Mar., 1952
Co-operative Livestock
Auctions .....Mar., 1952
You'd Never Know the
Old Place .....Apr., 1952
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a Future .....Apr., 1952
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Extension Service .....Apr., 1952
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The Identification and Judging of Crops, Weeds and Plant Diseases — By Harold K. Wilson and Alvin H. Larson. Spiral binding. 1940. Webb Pub. Co. Much in demand for agricultural classes. Used also in the Veteran's Farm Training Program $1.25

Farm Business Management — By Robertson and Woods. 1951. 546 pages, 248 illustrations. J. B. Lippincott. Prepared for use in all farm management and marketing courses. Combines the most up-to-date and authoritative content with the best farming practices available today in the field of farm management $3.80

The Hog Annual — Published by Farm Quarterly Magazine. March, 1952. Approximately 500 pages. First complete hog annual ever published. Contains names of all breed associations, secretaries, pig hatcheries, livestock yards, livestock commission salesmen, all of the hog farmers who sell over 400 hogs a year—fine articles on housing, sanitation, breeding and farrowing ...$5.00

Feeds and Feeding — New Edition (Abridged) — Published May, 1949. By Proffessor F. B. Morrison, Cornell University. 630 pages. Illustrated. $3.50

Cowphilosophy — By Mark Keeney. Second edition to which has been added the "Herdsman's Corner" and new material by the author. Fifty per cent larger. Holstein-Friesian World. A best seller since its first appearance in 1939. No agricultural book ever received a more enthusiastic reception from breeders and educators. Many college professors made Cowphilosophy required reading for their advanced classes in animal husbandry $3.00

Grasses and Grassland Farming — By Hi Staten. Published December 1952. Latest, most comprehensive authority on pastures and grassland farming. Includes latest discoveries, research and experiences of farmers and ranchers. An interesting book you won't want to put down. Introduction by Louis Bromfield. Seventeen chapters, everything from "Grass the Money-Maker" to "Grass Breeding." 320 pages. Clothbound. Well illustrated $5.00

Livestock Health Encyclopedia — By Seiden. Published November, 1951. Springer Publishing Company. Most recent veterinary book published, over 600 pages of helpful and useful information on how to diagnose and treat every ailment of livestock. Well illustrated $7.50

Hunger Signs in Crops — By the National Fertilizer Association. Clothbound. Published by 15 experts. Shows by accurate color photos how different crops appear when they lack essential plant foods and trace elements. Now completely revised and enlarged, 270 pages of text and illustrations. It is accurate, easy to understand and the information can be put to practical use on the farm $4.00

Judging Dairy Cattle — By Harrison, Strohmeyer and Carpenter. 132 pages, 193 illustrations, 7x11, clothbound, John Wiley & Son. This is an excellent book for the student of dairy cattle judging. Chapters on feet, legs and udders alone make it well worth the study of any dairy cattle breeder $3.75

Financing the Farm Business — I. W. Duggan and Ralph U. Battles. Approximately 350 pages, illustrated. Published 1950. John Wiley & Sons. Here is the most practical and useful book on farm finance ever written. It tells the present or potential farmer how to get the credit he needs to lease, buy or operate a farm without burdening himself hopelessly with debt $3.00

There is an easier way . . .

LET YOUR BANK KEEP YOUR BOOKS

Unless you are a former bookkeeper or business school graduate, farm account books now available are anything but simple, in spite of claims made for them. Actually, there is no "lazy man's" way to keep financial records of a farm business. But, unless you want to pay more tax than you are required to, it is mighty important that you do keep records of income and expense.

The one relatively simple way is to **let your bank keep your books.** In other words, (1) pay for all your farm expenses by check, and (2) deposit all your farm income. Write on each check stub what the payment covers. Write in your deposit book where each deposit came from.

It probably will be necessary for you to set up a special farm checking account or in other ways identify farm transactions from personal or household expenses. You will want to reduce the number of checks by paying monthly bills. You will still have some expenses paid "out of pocket" and a few things to note, but keep in mind that a dollar expense forgotten costs you about 22c or more in taxes and you won't forget often.

The big advantages of this system are that it automatically records transactions where they won't be lost or forgotten, and it lets you do your "bookkeeping" all at one time if you want to. At the end of the year, you sort and summarize expenses from your check book and all income from your deposit books. Bring your depreciation, inventory and capital records up to date, which needs to be done only once a year, and you have a comprehensive record good enough for any business.